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PRINCIPLES OF SECONDARY EDUCATION

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PRINCIPLES

OF

SECONDARY EDUCATION

A Text-Book

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NEW AND ENLARGED EDITION

VOL. I

I. BASIC IDEALS
II. THE STUDIES

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PREFACE

SINCE the first edition of this volume was issued seven years ago, there has been a rapid development in some aspects of the American high school. The function and educational value of the several studies have not been materially changed; consequently no sufficient reason exists for altering the parts of this book that pertain to those topics.

Much pressure, however, has been brought to bear upon the high school to compel it to alter somewhat fundamentally its leading purposes, especially with respect to vocational ends.

This powerful modern movement calls for a reëxamination of educational principles in the light of present conditions. What high-school leaders and teachers seem most to desire is a perspective of the whole situation, in order that they may estimate correctly the validity of the respective claims of general and special education, for they fluctuate according to the needs and conditions of various locations.

To meet this need for perspective, six chapters upon "Basic Ideals for Educational Progress" have been added. They consider progress in education from the

following standpoints: prosperity; health; general, or cultural, education; special, or vocational, education; eugenics and euthenics; and the reciprocal relations that should exist between individuals and social groups.

The appendices of the first edition are now omitted, having become comparatively useless by reason of rapid changes in the high-school curriculum, and having been made mostly unnecessary by the accessibility of recent data upon courses of study.

The most prominent purpose of the remainder of the volume is to reveal, through an analysis of the content of the studies themselves, their inherent and comparative educational value, and upon the basis of the values thus established to determine the best possible combination of the studies into the various curricula now demanded.

A second purpose, of almost equal weight, is to show how, upon the basis of the proposition that education for insight must always be accompanied by training for efficiency, secondary education can most effectively perform its proper functions.

Cornell University,
January, 1914.

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PART I

BASIC IDEALS FOR EDUCATIONAL PROGRESS

CHAPTER I

PROSPERITY AND EDUCATION

The measure of prosperity is income; the educational means for its attainment is training for efficiency.

1. Measure and Means

To be attainable, an ideal must have a definite standard by which its realization can be measured, and it must have equally definite means through which it may be approached. Ideals which lack these characteristics belong to the domain of "pious wishes." Thus one man may sigh for the beautiful or the good, another for the elimination of vice or crime or injustice or poverty or disease, without devising measures of progress or means of accomplishment. These are utopian ideals, laudable perhaps in purpose, but impotent in execution.

2. Income as a Measure of Prosperity

Income is the primary measure of prosperity, because it is income that makes everything else possible. Adequate income is the antecedent of saving, the presupposition of a normal moral life in the community, the prerequisite of comfort, and the indispensable basis for progress in the arts and sciences. Virtue is unduly

tempted when it is paid five dollars a week, while vice offers twenty-five; frugality is paralyzed by the constant presence of misery due to want; again, who can delight in art when his children cry for bread?

Income is an economic index of even non-economic efficiency. If a man is going to be a minister of the gospel, his efficiency should be such that he can command a salary commensurate with comfort and progress. The same is true of the teacher, or of a member of any other learned profession. That those who are to participate directly in economic production, exchange, or distribution should be trained to earn an income adequate for progress in morality and well-being is a well-nigh self-evident proposition.

This income measurement, therefore, applies to all workers in society, for not only is the worker worthy of his hire, but he should be worthy of an income sufficient to secure progress because of the inherent value of his services. However much treasure is laid up in heaven, enough should also be laid up on earth to secure the essential progress of the individual and his dependents.

3. Choice and Valuation of Means

The prosperity of a people or of individuals is bound up with many economic and political causes and conditions which an educational work is not called upon

to analyze or evaluate. The essential question is, By what means can education most effectively and most universally promote prosperity?

The means must not be limited to a single class of the population, as, for example, industrial workers, for prosperity is as much needed by the non-industrial classes as by others. Poverty incites to rapacity or servility, rather than to the highest type of service to man. Moreover, who wants a professional man or a statesman who can earn no more than a pittance? The meagreness of his reward is to some extent at least an index of the worth of his views. The primary means, moreover, must underlie the secondary as their logical presupposition. Thus, frugality should not be put first, since it cannot thrive below the margin of decent subsistence.

Training to economic efficiency must then, on several grounds, be accepted as the primary educational means for promoting prosperity. In the first place men can prosper honestly only to the extent that they can render services that others are willing to pay for, and the degree and rank of the efficiency determines in the main the worth of the service. In the next place a developing society moves rapidly and steadily away from the unskilled. An educated public does not care to listen to a narrow-minded preacher, or employ a badly trained physician, or elect a blatant, bladder-

brained politician, or employ a teacher who is snugly embalmed in the traditions of an outgrown civilization. Neither does it want a muscle- and mind-bound mechanic who cannot adapt himself to changes in machines and methods. Finally, without efficiency nothing follows; with it, everything desirable becomes possible. Therefore, though it be granted that other elements influenced by education contribute to prosperity, and though our results may be realized only in the somewhat distant future, may we not accept this principle of training to efficiency as the best means known to education whereby it may contribute to progress in prosperity?

4. Deficit and Surplus: Two Types of Economic Society

"Society" is not static, the same yesterday, to-day, and to-morrow; but, like the individual, is subject to growth, to arrested development, and to temporary decline. It may be benevolent and life-giving or tyrannical and oppressive — helpful or helpless.

It is, moreover, not one great undifferentiated entity, but a complex of many partially interpenetrating groups pertaining to government, religion, education, family life, and, above and beneath all, of economic groups for producing and distributing wealth. It is perhaps natural for the young to assume that as things now are, so they

always have been. But this, of course, is not the case. Perhaps the most illuminating distinction between the past and the present of economic society is that emphasized by Patten, first in his "Theory of Social Forces," and more recently in his "New Basis of Civilization" and in his "Social Basis of Religion." He contrasts the stage of a national, or social, deficit with that of a social surplus. These stages may be briefly described as follows: —

(1) *The State of Social Deficit — A "Pain" Economy*

In such a stage of civilization there are two chief classes of men: the exploiters and the exploited; the strong and the weak. Wealth is indeed produced, but it is inadequate to secure progress. What there is flows from the weak to the strong, except the bare amount requisite for bodily existence. A society in a fixed state of financial deficit lives in a condition of fear and uncertainty with their attendants of suffering and sacrifice as prerequisites for living at all. Such a society is weak in its resistance both to foreign aggression and to domestic exploitation. In earlier times the masses were either enslaved outright, or held in some sort of servitude, as in Sparta, or in Europe during the feudal system, or, more recently, in Russia. The morality of such a system is one of sacrifice; merit is measured by suffering. The bad results to the few strong leaders are

arrogant assumption of authority, unregulated power, and ultimate deterioration in vigor because of dissipation; to the poor they are dire poverty and its attendant evils, arrested development, misery, vice, crime, and a general state of sheep-like subjection.

(2) *The State of Social Surplus — A "Pleasure," or Coöperative, Economy*

A society with a social surplus has the capacity for progress. Wealth no longer flows in an uninterrupted stream from the weak to the strong, but with a vigorous return current from the strong to the weak. This return current flows through many channels, social and individual. Thus, in the United States the money donated annually to benevolent purposes often reaches the enormous total of a quarter of a billion dollars. Much more gigantic are the sums spent in public improvements.

When a nation is producing much more than is needed for bare subsistence, that is, when it has a decided social surplus, then society becomes more democratic, and the masses, rising above abject poverty, shake off their worst miseries, become more self-respecting, have their powers of initiative aroused, and gradually emancipate themselves from the pains that inevitably accompany a state of deficit. Foreign aggression is so hotly repelled that

it ceases to be a perpetual and serious menace. Great cities are built, industries developed, national defence provided for, universal education up to a certain point maintained, and the arts and sciences so developed that they provide new sources of general welfare and social progress. The morality of sacrifice gives place to the morality of progress through voluntary coöperation; fear is replaced by hope and love, and though vice, crime, and misery may exist, they are mitigated, and to some extent successfully combated. On the other hand, prosperity, partly because of faulty distribution, leads to evils of its own. Among these are the degeneration caused by the dissipation of those who have too much, as well as by the underdevelopment of those who have too little. A wild animal may gorge himself without harm because he must put forth so much effort to catch his prey, but the intellectual worker or the physical idler who gorges himself on food or drink soon lays the foundations of disease and premature death. In other words, he subjects himself to various forms of degeneration, thus injuring not only himself, but his children, since they become fewer in number and poorer in quality. But on the whole a society with a surplus is greatly to be preferred to one with a deficit, because the surplus is the indispensable means for progress. Fear and pain are not the best nurses of peace, love, and progress. While fear may

preserve the social groups, it checks at the same time their free development.

5. The Need of More Widespread Prosperity

A distinction must be made between the prosperity of the individual and that of the social whole to which he belongs. National economic efficiency may pile up a rapidly increasing social surplus, say of two billions a year, as in the United States, yet permit the widespread poverty of individuals to remain a painful fact.

A growing social surplus in a nation sets many problems that education is not called upon single-handed to solve. Perhaps the greatest of these is the equitable distribution of wealth: first, between its producers and the general public through taxation, in order that education, protection, and an environment favorable to development may be provided for all; and, second, among the individual producers themselves, that poverty may not arrest the budding powers and virtues of the young, or luxury and misguided energy enfeeble those most able to exploit national and other resources. The solution of these great problems of the distribution of wealth belongs to statesmen, economists, moralists, and to the enlightened public opinion of adult citizens. Education can perhaps help to establish and inculcate principles of distribution, but it has no machinery for their application. The same is true in greater or less

degree in the legal, political, and religious aspects of community life.

But in so far as public and private prosperity depend upon the efficiency of the individual, education has much to say and do.

6. First Requisite in Training for Efficiency

Efficiency is a universal category, and income is its economic coefficient. However reluctant we may be to measure a man's inherent qualities by his relative income, as in the case of a mental worker, like the teacher or the preacher, yet to a considerable extent such a measure is not only fair, but inevitable and desirable. Competition, adjustment, and the conditions of environment complicate the problem, but they do not materially alter the fact that what a man does for his living has its money measure. Every man, therefore, whatever his calling, should be able to earn an income sufficient for progress in the essentials of life, the preacher no less than the blacksmith, the employee of commerce no less than the worker in productive industry. If economic efficiency is a necessity for everybody, then the means for gaining it must be available for all.

The most fundamental agent of education is knowledge, for this term sums up all that the accumulated experience of the past has to offer us. It is our great social heritage, which, as Goethe says, each must earn in order

to possess. Earning means learning, and upon the manner of the learning depends, so far as the school is concerned, the degree of efficiency that will be attained.

Therefore the categorical imperative of education is this: "Carry thy learning to the highest possible point of efficiency in application." This means that if one studies language, one shall be able to make this study of the greatest possible utility in the appreciation and in the expression of thought; if studies in mathematics are pursued, they shall proceed to the point of ready use as instruments of measurement and calculation in the solution of the quantitative problems that are encountered in actual life, and so in turn for each of the studies of the curriculum. Teachers are usually content if the student shows a clear intellectual grasp of the facts or principles involved; but this is not enough, for efficiency is not attained in this field until what is clearly comprehended is vividly applied.[1]

The excellence of instruction in technological institutions is due, not so much to the fact that they deal with practical subjects, as that they carry knowledge to the point of practical application. This is an excellence that must be emulated by all grades and kinds of schools, the classical no less than the commercial or industrial,

[1] See the author's distinction between *clear* and *vivid* ideas, "Interest and Education," p. 44.

the lower no less than the higher, if education is not to stop short of the point of efficiency.[1]

That there are other requisites for training and efficiency is most certain, but the one named comes first. The others will be developed in due order in subsequent chapters.

[1] For details as to how this end is to be effected, see Part II, ch. V.

CHAPTER II

HEALTH

The measure of the degree of health that promotes progress is surplus energy; the means for its attainment is hygiene, both public and personal.

1. Surplus Energy as Measure

There are many reasons why health should be considered next in importance to existence itself, since practically everything that makes life worth living at all is dependent upon it. These considerations, however, are not the theme of the present chapter. The measure of health that promotes progress and the means for attaining such health are the topics before us.

(1) *Development of Latent Characters*

That surplus energy is the measure of the degree of health which promotes progress may be seen from its influence in the development of latent characters. Most biologists are now convinced that acquired characters, whether mental or physical, are not inherited by the young, but that all inherited traits come through the germ-plasm. Those characters come to the front

whose development is stimulated by the environment, while those not so stimulated remain more or less latent, waiting for the right combination of circumstances to bring them into activity. Acquired characters are precisely those that have been forced upon men by the environments in which they have lived. So long as these do not change, the young, both by imitation and by compulsion, have to acquire similar characters in order to thrive under the given conditions. Environments of social deficit, with their attendant evils of pain, fear, misery, and sacrifice, have compelled the acquisition of certain characteristics, but they have hereby suppressed the development of other characters quite as natural that have been inherited in a latent form. Thus, primitive fear of natural forces is transformed by knowledge into confidence of ability to use them as instruments of progress. Social surplus, on the other hand, releases the pressure hitherto exerted by environing conditions and permits latent characters to have a more natural development. The primitive in us impels us to kill wild animals; but a state of society in which they are no longer dangerous or are not needful for our support, allows sentiments of toleration concerning them to develop. Not everybody now tries to kill every harmless snake he comes across, and many indeed now consider hunting a relic of barbarism.

A social surplus acts, therefore, in a double way. It

gives, first, freedom for the development of latent characteristics; and, second, increased energy to facilitate their development. This is the surplus energy generated by the health made possible by a social surplus.

As history so abundantly shows, a general state of deficit in a nation or a continent, whether this arises from decreasing rainfall, poverty of natural resources, or overpopulation, means abject subjection and exploitation for the mass of mankind, and a chronic state of fear and pain. So long as this condition lasts, there are no upward avenues of hope for them. The characters they have been forced to acquire, they are forced to engraft upon their offspring. But when national wealth so far accumulates that there is plenty of food for all, and when both the power and the disposition to exploit decline, then new energy is given to men, hope displaces despair or stolid endurance, and new channels of activity are opened to young and old.

Among parents, lessening oppression and growing energy arouse ambition. New occupations are often entered upon, and other environments are sought where the new force and freedom may have broader scope. This is the meaning of the immigration to America by adults for the past four hundred years.

Important as this access of energy is to parents, it is still more important to children. In the first place, it gives them a longer childhood, in that it releases them

from the benumbing effects of premature toil, together with its correlative impressment of acquired characters. Increasing prosperity means abundant food, as among the pioneers of America, and finally, as now, it means greatly extended education. The result is that the natural qualities which were kept latent by an oppressive environment have free scope for development.

Each new generation seeks to rise to a higher plane of social life, for the plastic mind of youth, no longer forced by poverty into set moulds, responds to new stimuli, puts forth new growth, and readjusts its mental characteristics. Freedom from external codes of conduct and from the internal fears that the past has impressed, makes mental reconstruction possible. If our economic problem is to avoid deficit and accumulate surplus, our psychical problem is to suppress the old ideals of pain and fear and now useless sacrifice, and to awaken the dominant personal and social qualities that make for progress.

(2) *Surplus Energy and Life*

If surplus energy is important in the development of new traits, it is no less important in the conduct of life itself. So far as the mind is concerned, the doctrine of interest shows us that benumbing drudgery becomes interesting work when the interest in the final accomplishment is carried back and attached to the means for reaching the end, as in carrying out an original design for an

artistic product; the physical counterpart to that doctrine is that there is no drudgery so long as there is an abounding supply of energy. Even the most prosaic physical labor may be performed with zest, provided there is such a supply of surplus energy as to render its expenditure a physical satisfaction. Energy and interest are, of course, natural complements, each of the other. When both are present, life and all its labor are filled with zeal. They are the sources of hope and good cheer, of pleasure and enthusiasm. Interest declines with the expenditure of energy; it revives with the restoration of nervous force. The *ergograph* is always able to tell the story of permanent or fluctuating energy. That this energy may be kept in its lowest estate of muscular routine or raised to its highest powers in mental efficiency is most true, but this is not the important point, since the use to which energy shall be put is not the same as the question of its abundant presence.

Whether, therefore, we think of the development of latent characteristics or the conduct of life itself, surplus energy must be regarded as the physical measure of health that leads to progress. Health of this sort not only preserves life and conserves comfort, but it does more. It gives the buoyant step, the clear eye, the smooth, perfect skin, the wholesome complexion, the penetrating insight, the elevated purpose, the resolute will; it releases, moreover, unused stores of native

ability, while it diminishes pain and fear and increases the enthusiastic zest of life.

2. Public Hygiene as Means

The means for securing the degree of health that promotes progress are public and personal hygiene. Education can affect the former both directly and indirectly; directly through the administration of school hygiene, and indirectly through imparting knowledge and developing ideals.

(1) *The Prevention of Disease*

The immediate purpose of public hygiene is to remove or lessen the causes of physical ills.

How important for progress the matter of public hygiene is, may be seen from the consideration of a few facts that investigation has revealed. In the United States, on the average, three million people are found to be ill at any given time. Of these half a million are male wage-earners over fifteen years of age. The estimated annual cost in loss of wages and expense of medical attendance is shown to be well over a billion dollars, or about one-half as much as the united savings of the nation amount to. Seager[1] estimates that if the conditions concerning the four items, *water*, *milk*, *air*, and *accidents*, were made as favorable to health

[1] Seager, H. R., "Social Insurance," ch. II.

as public hygiene is capable of making them, the average length of life in the United States would be increased by eight years. Gould maintains that at least one-third of the suffering and loss due to disease is preventable.

People will doubtless continue to die of disease more than of old age, but they need not die so soon. Kober finds the annual loss from typhoid fever to be three hundred and fifty million dollars, yet so preventable is typhoid that one writer declares it should no longer be listed as a disease, but rather as a crime. Improved water supply enabled Lawrence, Massachusetts, to reduce the death rate in typhoid from one hundred and five to twenty-two per one hundred thousand, and Pittsburg from one hundred thirty and eight-tenths to forty-six and six-tenths. Yet that even these lower death rates in these cities are still criminally high may be seen from comparison with the figures for European cities. During 1907 the death rate there from typhoid per one hundred thousand was as follows: London, 5; Edinburgh, 2; Paris, 8; The Hague, 1; Berlin, Hamburg, and Vienna, 4 each; Munich, 3.

That eight millions who are alive to-day in the United States will die prematurely of consumption is certainly an appalling fact, yet the destruction that comes to guilty and innocent alike from disease generated by vice is still more distressing, for to the pain of suffering is added moral degeneration. To diseases of this kind

are ascribed 80 per cent of blindness, 75 per cent of the operations upon women for inflammation, and a large per cent of infant mortality. In France alone 20,000 children die annually from such afflictions. No nation has thus far successfully combated diseases associated with vice, because sentiment has hitherto prevented the public from treating all infectious and contagious diseases alike. Former President Eliot [1] vigorously urges legislation compelling physicians to report all such diseases, whether socially disgraceful or not, to the board of health. He demands a new code of ethics for physicians, who permit the innocent to suffer, because they hold themselves bound by the oath of Hippocrates to keep secret all relations between themselves and their patients.

(2) *Mental Hygiene*

Of equal importance with public measures to prevent disease, are the provisions for what may be called mental hygiene. The best of bodies are liable to decline in vigor and efficiency in depressing or hateful surroundings. Squalor and ugliness attack the mind perhaps as fatally as they generate bacteria to afflict the body. Health thrives best when sunshine lights up what is pleasing to the spirit: open spaces, trees, birds, flowers, pleasant sounds, artistic buildings and grounds, and inspiring works of art, not only in museums, but on every side.

[1] Eliot, C. W., in *Social Diseases*, October, 1911.

Youthful America has in the past been disposed to keep her art, such as it was, in her cemeteries, so that to one depressing influence she has added another. But a better day is coming. Already people talk of a "city-beautiful," and in most places they have at least an annual cleaning-up day. Schoolrooms are now frequently beautifully decorated. The goods in shop windows are often tastefully and sometimes beautifully arranged, so that occasionally one may behold a garment fit to adorn a Madonna or a hat that Venus herself might deign to wear. Some day art will overtake and then distance the ugly in sights and sounds, even in our largest cities. Under such conditions energy will not be dissipated in defending the mind against the offensive noises and hideous sights that now so frequently assail it. Conditions that prevent diseases of the body, and surroundings that promote the elasticity and joy of the mind, unite in the hygienic city to fit men for the most rapid and enduring progress of which they are capable. What is true in the city is equally true in the country, except that there, personal outweighs public care of health.

3. Personal Hygiene as Means

The need of personal hygiene for the young, under the leadership of the school, may be considered from several

standpoints. If diseases controllable by public hygiene are decreasing, many that are controllable only by personal hygiene are increasing; thus since 1882 kidney troubles have increased 131 per cent, heart disease 57 per cent, and apoplexy 84 per cent.

(1) *Artificial Conditions of Life*

The artificial conditions, first of education and then of life itself, demand protective training of the body to withstand them. Why do so many of the young and middle-aged have to see the world through glasses? Partly because of much reading by artificial or inadequate light. Why are so many rendered miserable and less efficient than they otherwise would be by difficulties of digestion? Why so liable to infectious diseases like grippe and pneumonia? The answer is still the same, — because of the artificial conditions imposed by sedentary occupation in furnace-heated rooms, inadequate exercise in the open air coupled with overeating of unsuitable food, the worry and rush of modern urban life, and the like. Again, this is the plastic age of man, when the tides of life run high, and when the whole organism, nervous and muscular, may be built up for a long life of health and vigor even under the adverse conditions of situations new to the race.

The remedy for diseases due to too much artificiality is a return to more primitive conditions. When dys-

pepsia arises from food from which the cellulose has been extracted, as in white flour, we may recover on a diet of shredded wheat, which retains it all. Cellulose is not a food, but it is a mechanical aid to digestion. Primitive men ate their cereal foods just as nature produced them, and thus established for their posterity the conditions for healthy digestion. Similarly, when life in close, vitiated furnace-heated air causes delicacy or disease of the lungs, the remedy is not drugs, but fresh air day and night, summer and winter. Again, when jangling noises worry the mind, when overworking and overeating throw the nervous system out of gear, the remedy is still, back to nature. Flee to the woods or the sea, where the only sounds are those that nature produces, and where darkness soothes to rest and slumber. Then, if the stock of vital energy is not wholly exhausted, rest and pleasant exercise and social companionship and wholesome food will bring back in full volume the tides of life.

(2) *Resistance to Disease*

The first thing that personal hygiene must strive for is resistance to disease. This is necessary after all possible precautions concerning diet, clothing, cleanliness, and the like have been taken. If the mucous membranes of the body are sensitive to infection, there is danger everywhere. Bacteria are ubiquitous; they

swarm in earth and air and water; they infest our food and houses and clothing. It is impossible to escape them, but if there are the proper powers of resistance, the human body is more fatal to harmful bacteria than they are to it. To a healthy adolescent, bacteria constitute the least of dangers; the peril lies elsewhere — in misdirection or dissipation of energy for ends that do not promote health or enduring happiness or individual progress. How the needful vigor and vitality are to be developed, it is for the school to teach. Among the best of books on this subject are Gulick's "The Efficient Life,"[1] and Saleeby's "Health, Strength, and Happiness."[2]

(3) *The Direction of Surplus Energy*

It is indeed a great thing to inculcate ideals of physical excellence and to aid in realizing them; but this is relatively easy, since the young are eager to achieve physical excellence. But it is at once more difficult and more imperative to direct these powers to the proper ends, since lower ideals have to give way to higher. We have here one aspect of the whole of education. It involves the training of mind, the direction of the will,

[1] Gulick, L. H., "The Efficient Life," Doubleday, Page & Co., New York.

[2] Saleeby, C. W., "Health, Strength, and Happiness," Moffatt, Yard & Co., New York.

and, above all, the constant exercise of the constructive powers. Knowledge, discipline, culture, efficiency, are all involved. When we fit for economic efficiency we direct the surplus energy to useful ends; we do the same when we train for citizenship and when we develop artistic powers. Youth should be imbued with intellectual and æsthetic and volitional consciousness, and his energies should be trained to flow in all these channels. He must be a member in many social groups, and here again his energies find abundant scope; he must also live his individual life, making it rich and full to overflowing. In short, wherever he comes into contact with life, in work or in play, in public or in private, there he must turn on the full currents of vital energy, for here as elsewhere to sow is to reap, to spend is to create anew.

4. The New Asceticism

The cult of muscle as an end appeals spontaneously to youth, as is abundantly shown in school and college. If we contrast the instincts of the young with the asceticism that prevailed in the Middle Ages when the body was considered a clog on the spiritual life, it must be confessed that the youth holds the better view. But there is something else. Since the brain and nervous system are peculiarly the organs of the mind, hence of the spiritual life, Saleeby contrasts the older asceti-

cism with what he calls the newer asceticism. The older declared that since the spiritual is the true end, the body is at best a necessary evil, and is to be subordinated accordingly; but the newer asceticism maintains that since the spiritual can be obtained only through the agency of the central nervous system, it follows that this becomes the immediate end of physical development. Though we arrive at a species of asceticism by this reasoning, the result is radically different from the conclusion of the ascetics of the Middle Ages; for instead of considering physical development as an evil, we must promote it as a necessary prerequisite of the higher life of man. Perfect the circulatory, the digestive, the muscular systems of the body? Most certainly, but not as ends in themselves. Develop them for the welfare of brain and nerve, for upon these depend the higher life.

Here is a mediating idea that bridges the chasm between the old contempt for the body and the newer admiration for it and for physical training. It ennobles the aim of modern hygiene and is capable of satisfying alike the aspirations of youth and the truer valuations that come with adult years. Muscle, brain, mind. This is the true order. Muscle for brain, brain for mind. Saleeby declares that nine-tenths of the infants born even in the slums are physically splendid little specimens of humanity. It is the function of private and public

hygiene to preserve them, to develop them, to conserve them for their own good and the good of the public. We must always remember that the essential part of physical man is his nervous system; that muscle is an instrument of brain and that brain is the organ of the mind. "The brain is the man."

The voice of the Middle Ages speaks as follows: "The soul or the body, which? Choose between them; you cannot have both, for they are so adjusted that when the one goes up, the other goes down." The voice of the present is to this effect: "The soul *and* the body; we must have both, for as the brain is, so is the mind; and as the rest of the body is, so is the brain."

What are the best reasons why youth should conserve and properly use its surplus energy? First, that it may do its appointed work, and then that the central nervous system may not be impaired, either by vice or by drugs or by those forms of dissipation that undermine, first the health and then the morals.

It is for these reasons that surplus energy is the measure of the health that promotes progress, and that public and private hygiene are the adequate means for attaining it.

CHAPTER III

POLITICAL DEMOCRACY AND GENERAL EDUCATION

The measure of political democracy is civic equality; its educational means is culture.

1. The Implications of Civic Equality

The most primary meaning of this term in a democracy is that there is a common life of the people into which every individual is born and in which he has certain rights to enjoy and duties to perform; that as a citizen his civic equality implies that his rights and privileges arise from properly meeting his responsibilities. The eighteenth century notion that men are born with inalienable rights that exist and must be respected whether the correlative duties are performed or not, reduces a man to the plane of an animal; for the only "rights" an animal enjoys are due, not to its own character, but to the character of the man who extends them. If life is an inalienable right of animals, why do men kill them for food? If life is conceived to be an inalienable right of a man, it is only because it is assumed that he will properly meet the social duties that such life implies.

How otherwise can we explain capital and other punishment?

But if rights imply duties, then it is evident that the young must be trained in disposition and ability to meet the responsibilities that citizenship involves. An aristocracy implies a proletariat. It is the privilege of the former to command, the fate of the latter to obey. In the crudest stages of this relation, the proletariat have no rights the aristocracy are bound to respect. The masses may be used as food for powder, or as beasts of burden. In more advanced stages of such a social organization, some privileges are fixed by statute or enforced by violence. But at their best such governments are far from being democratic. On the other hand, it is possible to retain remnants of the old aristocratic forms, as in England, and yet to attain the essence of democratic government.

Civic equality implies, therefore, not unearned privilege, but trained competence to render social service. Every child is born to citizenship; this is in turn a benefit and a duty, a privilege and a responsibility, which cannot escape in a democracy. The more he fails, he either for want of ability or of disposition to enter into these mutually obligatory yet beneficial relations implied by the word *democracy*, the nearer he approaches the animal, which may arouse the pity and sympathy of mankind, but which lacks the essentials of civic equality.

A democracy has no place for a proletariat, a horde of men who have nothing but the labor of untrained muscles to sell. Neither has it a place for another but smaller horde of vandals whose motto is, "Get a plenty while the getting is good," and whose performance is the exploiting of public wealth for private benefit.

Citizenship has long been a word to conjure with, yet it has often been wrongly or inadequately conceived. Sometimes it has meant blind, unintelligent militant allegiance to the country in which the citizen lives. At other times it is made to mean partisanship or provincialism. Some limit the term to *governmental* relations, and thus identify patriotism with willingness to serve in army or navy or police squad in times of public danger. But the term involves a much wider set of relationships into which the young citizen must be inducted and for which he must be prepared. Some of the most important of them may be briefly described, as follows: —

(1) The beginnings of citizenship take their rise in the home and the school, for these are social groups in which all must take their place and fulfil their various functions both of privilege and responsibility. Naturally the form of government is at first more or less autocratic, yet even in the home mutual helpfulness may be early inculcated, while in the school authority cloaks itself more and more in the garb of politeness and in the form

of devotion to social ends. It causes children to have the feeling that in some measure they are helping to govern themselves, not for the sake of government as an end, but for the promotion of the common interests which the school represents.

(2) Citizenship reaches its highest estate in government, national and local, and in the manifold political, economic, and legal relationships involved. It is not so much a training in the technical machinery of government that youth needs, as general intelligence and public spirit; for a distinction must be made between training for such a thing as civil service and education for civic equality in the system which civil servants administer. The one is special, the other general, education. Herbert Spencer in his famous plea for science in education did not distinguish sufficiently between science for the specialist, who bases his profession upon it, and science for the man on the street, who reaps manifold benefits from the application of science through the expert, without, himself, needing to know very much about it. Then just as there is the study of science for the general conduct of life, as well as for specialists, so there is study of citizenship for participation in the common group life of men, as well as for the training of experts.

It is perhaps assumed by some that civic equality is passive, or static, and operative by virtue of legislation

alone. We say all men must be *equal before the law*, meaning thereby that each has legally the same privileges as another, and that each is under the same prohibitions; or if two men appear in contention before the bar of justice, each is subject to the same rules of evidence, each has the same rights of appeal, postponement, etc. For example, a suit at law against a college president for alleged defamation of character has just been decided in the Supreme Courts of one of our states. That suit was begun *nine years ago*. Each contestant doubtless enjoyed the same legal rights, but both are presumably impoverished in purse and impaired in disposition. This static equality, though doubtless essential in a democracy, is far from being that of most value. There is also the equality implied by participation in group life. Political groups are national and state and county and municipal, or communal. To be a participant in a national group is to be intelligent upon national issues, which, in so far as they are not personal, are for the most part economic; as, for instance, questions of tariff, trusts, internal taxation, conservation of resources, national ownership and public improvements, schemes of reclamation, etc. To the man untrained to understand these issues, all politicians look alike, — sleek, well-fed, rapacious, and ready to dole out the penny of privilege for the pound of advantage. Citizens of this type are not the sheet anchor of democracy,

for though they claim protection because of their passive equality, they are unable to earn the active equality that comes of trained intelligence in the public service. Their life is parasitic, not coöperative.

What is true of citizenship in its national aspects is equally true and even more important in state, municipal, and other local government. Equality in participation grows in complexity and importance as it draws near home. Municipal misrule is at once the shame and the despair of democracy. It looks as if the people were permanently condemned to be the victims of chronic exploitative groups of political bandits. All this comes of accepting the ideals of passive citizenship, in which privileges do not depend upon correlative services. The remedy is a training in citizenship that fits the young by social intelligence, social disposition, and social efficiency to participate freely and effectively in political coöperation in all its manifold aspects. When communities grow so rich in conscience or so poor in purse that they insist upon training each citizen into civic competency, making his social receipts depend upon his civic deserts, then the passive equality on which we now insist will be displaced by a civic equality based upon coöperative civic participation.

(3) Much of citizenship is directly economic in character, as, for instance, the ownership and control of the great agencies of production, the protection of the

individual against economic accidents, the social conditions making for or against economic prosperity, such as war, peace, piracy, caste, race antagonisms, morals, freedom of contract, regulation of railroads, telegraphs, banks, combinations of labor or capital, care for the incompetent, and the like. Here, again, intelligence and efficiency are the essentials of citizenship.

(4) We have, moreover, social rights and duties that arise from our juxtaposition in civil life. A community with plenty of objective enterprises finds small interest in the pettinesses of personality; one that lives a purely subjective life will find room for slander and other hateful activities. Lacking common ends to work for, the people devour one another. It is far better for a community to set itself to catching flies than to indulge in mutual backbiting. One boy in Worcester, Massachusetts, under the direction of Professor Hodge, turned in ninety-six quarts of flies in a few weeks, while the community as a whole, through coöperation in fly trapping, was soon able to take down its screens in midsummer and live untormented by these pests. There are nuisances of many sorts that may be abated by mutual effort; there are many positive advantages always near at hand for those who look for them.

(5) Finally, citizenship is not complete until it embraces international relations. What are our duties toward

weaker nations? What toward equals? Should arbitration or treaties, or diplomacy, or political alliances, or battleships, or "benevolent" despotism decide the issues that arise? Is national equality based upon the same principles as civic equality among the citizens of a nation? Doubtless hereafter as heretofore international questions will be decided by the representatives of the people, and the public without consideration of its desires be left to reap the benefits or suffer the calamities of such action. However, an intelligent public opinion vigorously expressed by press, pulpit, and rostrum, especially if aided by initiative, referendum, and recall, will often be able to prevent precipitate action or to enforce the decrees of fairness and justice toward all nations.

The final conclusion must be that since civic equality implies social relationships so wide in scope and so intense in character, the education that prepares for citizenship of this kind must be both wide and deep, and of corresponding universality.

2. Culture as Means

When the word *culture* is made to stand as the universal educational means for training to citizenship in the comprehensive sense above described, it is manifest that there must be a reinterpretation of this well-worn term.

(1) *Culture as an Aspect of Education*

The most cursory reading of educational literature shows that the word *culture* has had a more restricted meaning than is here ascribed to it.

Rousseau contrasted it with *nature* and conceived it to be a social veneer of the aristocracy — an index if not a cause of their corruption. The conclusion of his first Dijon Essay is that, far from tending to purify morals, culture in the arts and sciences leads to the decay of morals; art is an ornament for impurity; courteous manners but transparent garments for indecency; the splendor of public life but the sign of the enslavement of the people. Culture is therefore in his eyes the symbol of all that is vile in private character and hateful in public life.

The humanists defined culture quite as subjectively as did Rousseau, but thought of it, not as a pernicious polish, but as an inner transformation of character — a total refining effect upon thoughts, morals, and manners which comes from insight into the literature, art, and philosophy of the ancients. To the early humanist the means of attaining culture was the study of the ancient languages. Until near the end of the nineteenth century this conception was held substantially unchanged, except that mathematics was gradually accepted as being on a par with Latin and Greek. To this honored

trinity has now been added the study of pure science. Gayley[1] speaks as follows: "A generation ago the scientists worked for recognition as educators of youth. They deserved to win; and they won. To know the law of the natural world is indispensable to him who would understand aright the law of the social. A fundamental and sympathetic acquaintance with at least one science, such as physics or chemistry, is as integral a part of culture as a fundamental and sympathetic acquaintance with the humanities." Shorey makes the same concession as follows: "It is time to recognize that the work of Huxley, Tyndall, Spencer, Youmans, and President Eliot has been done once for all. The victory of our scientific colleagues is overwhelming, and the Cinderella pose is an anachronism."[2]

Our net result so far is that the subject-matter of culture embraces the old humanities, mathematics and the new sciences.

(2) *Culture and Discipline*

Up to the present, culturists have distinguished between these terms, for though culture and discipline have been as closely connected as Siamese twins, yet they have not been one, but two. Thus Gayley in one

[1] Gayley, C. M., "Idols of Education," p. 91, Doubleday Page & Co., New York.

[2] Shorey, Paul, "The Case of the Classics," *The School Review*, November, 1910.

chapter writes of "The Collapse of Culture," and in another of "The Collapse of Discipline." By culture he appears to mean insight into the classics, for he writes: "To the abandonment of the classics with their sweet simplicity and their majesty, their orderly restraint and their severe regard, I attribute in no small degree the declining ability to think closely, to speak and write lucidly, precisely, effectively, the declining love of noble letters and noble art, — the declining respect for tradition and authority, for the heritage and the faith, — the declining splendor of the ideal." [1] How close at hand the other twin is, may be seen from the preceding page, where we read: "Equipment for liberal scholarship of any kind depends upon a knowledge of the classics. No better training in logical processes was ever devised than the philological discipline of the classics. No discipline more thoroughly systematized, more uniform, more definite, more rigorous."

If culture as distinguished from discipline means *insight*, discipline in language as distinguished from culture certainly means *efficiency* in the *use* of language as an instrument of thought and expression. Thus, bringing inherited conceptions down to date, we have the following equations: Education = culture + discipline; culture = insight into the thought systems of the

[1] Gayley, C. M., "Idols of Education," p. 96, Doubleday, Page & Co., New York.

humanities and the sciences; discipline = training for efficiency in the application of these inherited treasures of thought to their manifold uses in life.

These are clear distinctions and not useless in comprehending the purposes of that general education which is needed to fit men for democratic citizenship. Yet perhaps further analysis will show that this is not really a case of twins, even of Siamese twins, in which the blood of each circulates in the other, but a case of two aspects of one and the same thing, as is maintained by Dewey.[1] His definition is as follows: "Culture is the social insight and spirit to which useful skill, knowledge of fact, and trained mental power must all be made to contribute." In other words, *culture* has hitherto been conceived in subjective terms alone, as if the individual were a solitary and unique, not a social, being. But it is through group relations that we come to final values. Culture cannot function except in society, hence it involves as an integral part of itself all that we have meant by discipline. Hence our equation takes this form: Education for citizenship = culture; culture = insight through knowledge + mental discipline + skill in use; or, more briefly, culture = insight + efficiency. Culture is therefore the whole of general education, not merely a part of it.

[1] Dewey, J., "Culture and Culture Values," in Cyclopedia of Education.

(3) *Culture and Vocational Education*

There is, however, no real gain in converting the word *culture* into a term so general that it covers everything, for this would obliterate rather than clarify distinctions. The category *culture,* like most others, demands consideration from its two main aspects, *range* and *intensity.* A culture so wide in range that it includes everything known would be so broad that we should have to call it superficial; a culture so intensive that it includes but one subject of knowledge, we should have to call narrow. Evidently, then, a compromise must be made, so that there shall be some kind of harmonious balance between the range and the intensity of culture. It must be broad, but not so broad as to become superficial; it must have depth, yet not be so deep as to become narrow. It will not do to say, "If you know a little about a subject, it is cultural; if a great deal, it is professional." The consideration of mere quantity, just much or little, cannot settle such questions.

How then can it be broad, but not too broad; intense, but not so intense as to be narrow? By extending itself to cover the aspects of knowledge that are fundamental to ideal citizenship; by confining itself to the mastery of principles most needful in social action. A cultural education must include language, because this is necessary in order to see and make distinctions; it must em-

brace art, for an æsthetic consciousness is of the utmost importance in the enjoyment of life; it must in its higher reaches include philosophy, for to think deeply it is needful to know how men have thought; as a matter of course, it must accept history and civics, for these are the account of the evolution of freedom both in its ideals and in the machinery for their realization; culture must use mathematics, for daily living includes daily measuring; it must embrace a representative from each of the natural sciences, since they are necessary to that complete living for which Spencer pleads; and, finally, it must embrace economics, for each man must enter into that great system of activities whereby he gains his daily bread, and contributes his thought, his vote, and his moral and physical support to the establishment and maintenance of that social system which enables free men to live in a free society. Reversing this order and summarizing, a culture course must embrace economics, biology, physics or chemistry, an earth science, mathematics, history and civics, philosophy, art and language. So much for the range of culture.

What is the ideal depth of intensity? If we try to learn everything about each subject, we shall never cover the ground. The test here is the same as that for range, that which is most serviceable for the whole of community life. If the range of culture is to cover the insight most needful to complete social living, surely its

intensity must include such training as best conduces to social efficiency in the use of this knowledge. Confining our knowledge of subject-matter to the fundamental principles of the studies enumerated, we must carry our intensity to the point of readiness in their general rather than their special application. Thus, in physics, a cultural course seeks to understand *machinery* rather than a machine. It may be interesting to fight out the "battle of the valves" in automobile engines and to be able to discuss intelligently the relative merits of the poppet, sleeve, and rotary types, but it is more important in general education to know what bearing the gas engine has on industry, on city and urban life, on the pleasure, health, and prosperity of the individual. Again, in studying municipal government, the thing of most importance is, not how to become a successful politician, but how to act, what attitude to assume, in municipal business. A citizen needs a language, not to teach it, but to enable him to rise to higher intellectual levels in thought and expression; he needs art, not merely to enhance his own pleasure in life, but to promote a love and appreciation of the beautiful among men.[1] So of all cultural education, its primary purpose is not to make a living for one's self, but to make life more worth living for all men; not individual, but social, thrift; not the wel-

[1] See the author's volume on "Æsthetic Education," 1913, C. W. Bardeen, Syracuse, N. Y.

fare of the individual as a subjective entity, but as a functioning unit in a functioning whole. In short, cultural, or civic, education is for Man the Citizen.

(4) *The Limits of the Cultural Aim*

Where shall education for culture leave off, and that for vocation begin? A natural inference from the definition of culture is that it never ceases so long as education continues, for knowledge and mental training and skill in application belong to vocational no less than to cultural education. What actually change are aim and emphasis. In vocational education the aim is insight and efficiency in a gainful occupation; in cultural education the aim is preparation for those manifold universal functions that we collectively call citizenship. In emphasis the change is from balance of scope and intensity for a wide range of application to that narrowness of scope and degree of intensity which are necessary for success in a vocation. In due measure, therefore, all good education is cultural, and all cultural education is vocational in the sense that our larger institutional or social life is an occupation. In education we deal with the relative, not the absolute. In the words of Professor Conrad of Halle, the varying aspects of education are valid, "*bis zu einem gewissen Grade.*"

In practice there is wide range in fixing the point where cultural education shall end and vocational begin. In

Germany this point is at the end of the eighth grade of the common school, for all who attend it. These constitute about nine-tenths of the school population. The German school organization is such that there is no promotion from elementary to secondary schools after the end of the third grade, except at a loss of time to the pupil which becomes increasingly prohibitive. According to an estimation by Paulsen, not more than one graduate in ten thousand from the elementary, or *Volksschule*, ever gets into a gymnasium, or secondary school. After the fourteenth year, accordingly, all additional education is vocational. This is given for a stated number of hours per week, most frequently six, in continuation schools, and for three years. The pupil has chosen his occupation and is serving his apprenticeship therein, while the continuation school increases his knowledge and skill in the specific calling chosen. In the continuation schools of Munich, some forty trades are represented. Smaller cities limit the number according to need.

In the education of the so-called culture classes, general education closes with the gymnasial course, or its equivalent, at the age of eighteen or nineteen. When the student passes to the university or to the technological institute, he begins his vocational training.

In England it is the custom to carry cultural education through the university period. The Universities of

Oxford and Cambridge offer only culture courses. They are in no proper sense technical, as are the German universities.

In this country, as President Hadley says, we have been trying to drive the English and the German systems of higher education tandem. In theory we say the student should begin his vocational training only at the end of the college course. To this end we have invented the graduate system for those who do not wish to enter any one of the well-defined schools of medicine, law, or theology. This theory is accepted only to a limited extent. A few medical and law schools require the A.B. degree as requisite for entrance. Most do not. Some draw the line at the end of the Junior year of the college course. Others take candidates direct from the high schools. Most schools of technology also admit the graduates of the high school. Again, technical high schools admit the graduates of the grammar school, while it is now proposed that the beginnings of vocational education shall take their rise at the end of the sixth grade of the elementary schools. We draw the line, therefore, between cultural and vocational education at the following points: End of the college course, middle of the college course, end of the high-school course, end of the grammar school, and beginning of the seventh grade, — surely a system varied and elastic enough to suit all purses and all capacities. Though opinions may differ

as to how far it is rational, it must be admitted that each position is fortified with reasons.

Evidently under the conditions of American democracy no precise point can be fixed at which education for culture shall end and that for vocation begin, for to establish such a point would violate the principle for which the succeeding chapter will contend, namely, that of promoting *equality of educational opportunity for all*. By this is not meant that all should do the same thing, for there is nothing but verbal equality in that, but that each should have an equal opportunity with every other for personal and social development.

What an individual shall grow to be depends indeed upon heredity and upon acquired characters and upon the forces of his environment. We cannot change race or sex or native ability, but we can furnish opportunity for the development of every type of capacity by keeping open all the avenues of education from the earliest period at which they can be utilized. The mass of children have their development arrested early, if the chief characteristics of education are sitting still and absorbing knowledge. A few can endure these processes and still grow, but not many. Again, poverty, love of activity in the real world, restlessness under a reign of subjectivity or sentiment, the short-sightedness of youth, the selfishness of parents, and the like, all tend to limit education to the shortest permitted time, un-

less it is adapted to meet those psychological, material, and social needs most obvious to child and parent.

Since, then, culture is necessary for all as citizens and is to a degree found in all education, we shall be safe in urging the continuance of cultural courses as long as the student can be persuaded to pursue them, and at the same time we shall be justified in introducing vocational training as early and as fast as necessary to secure the student's presence in school and to promote his continuous development. In other words, psychological and economic, not merely logical, considerations shall determine the time of beginning vocational training and the degree to which it shall be specialized.

CHAPTER IV

ECONOMIC DEMOCRACY AND SPECIAL EDUCATION

The measure of economic democracy is equality of opportunity; the educational means for attaining it is vocational training.

1. Measure and Means

It may seem that we have equality in education when everybody is permitted to do the same things — pursue the same studies for the same time and by the same methods in elementary, secondary, and higher schools. This is indeed uniformity, but not a true measure of democratic equality. Only in the first six years of the elementary school, or during the period of the acquisition of the rudiments of knowledge and skill in the school arts, is there any true equality in our present system. If this is to be extended, instruction must be differentiated at the beginning of the adolescent period, so that every child may get the type of education best adapted to his talents and situation in life. In the nature of things there is but one class of ends so fundamental in importance that they are fit to measure equality in a democracy; namely, the vocational ends. To survive in decency and

comfort, to be able to live up to ideals of human worth and dignity, every individual must earn his living by producing for others what is valuable enough to be paid for. Lacking this power, all the graces that purely non-vocational education can impart, are but as a bed of roses on which to starve. Again, though it may be conceded that any education whatever, even that apparently most worthless, will enable some to earn a living, yet for the many such an education may have little or no economic value. There is no true equality of educational opportunity until the education for mental training and æsthetic cultivation also gives each pupil the best possible vocational preparation for life. Lacking this, all education beyond the most elementary is for the few, not the many. Granted that America needs to train scholars, that, as so many eloquently maintain, a million of them would not be too many, what is to become of the ninety and nine millions left? Are they not to count in a democracy? It is easy to say: "All who will may become scholars. The road is open." But it is not open. They could not tread that path if they would. Many lack the ability; most lack the means. We pride ourselves upon being the foremost democracy of the world, yet we are the rearmost among nations of our own rank in providing that vocational equality of opportunity without which there is no true economic democracy.

(1) *Basis for Economic Equality*

America has long been known as the land of opportunity. It has been our proud boast that each has an equal opportunity with every other to make the best of himself in the attainment of economic independence. The basis of whatever truth there has been in this boast has hitherto been free land. There has always been room in the West for those who had the courage to go. Horace Greeley's advice, not so much heard at present, was: "Go West, young man; go West! There you have but to tickle the soil with the hoe to make it laugh with the abundant harvest." The first great epoch of our history, that of free land, which for four hundred years has allured the pioneer, has now come to an end. Henceforth, if equality of opportunity is to be a reality, it must find a new basis. There are many schemes for economic socialism designed to attain this end, but their possibilities for realization lie in a somewhat distant future. The claim might be advanced that society is not biological, but chemical; not subject to growth, but to explosion; not in process of evolution, but of revolution. History has indeed recorded some revolutions, but they have been rather fulfilments of growth, or the removal of its obstacles, rather than its negation. But while we are waiting for a better organization of society by whatever process best pleases our fancy or appeals most to our

reason, the concrete problem of helping all men to realize the best that is in them is with us now. In the economic field democracy means equality of opportunity to make the best of inborn and acquired characters under inevitable conditions of the environment as we find it, or are able to make it. Legislation cannot be the ultimate basis for feeding, clothing, and housing mankind. Food must be produced from the soil, clothing and the other necessities of comfort must be manufactured, houses must be built. That is, the eternal economic needs of man are production and exchange and distribution. These involve working and saving and inventing; they call for skill and diligence, initiative and endurance, for adaptability and courage, for deepening insight and increasing efficiency.

Free land is a thing of the past; radical reorganization of society is a thing of the future; but the possibility of adequate vocational education is of the present. It is the best hope for a real economic democracy, the sure basis upon which we may build.

(2) *Vocational Training as Means*

Vocational efficiency is an aspect of citizenship, for it would be indeed a poor state that were made up of paupers. But vocation is an individual matter, since division of labor makes it necessary that there should be many vocations and many separate aspects of each.

For this reason cultural education alone no longer suffices to meet individual vocational needs. With free land as the basis of individual economic thrift, it might well seem to us that one type of education sufficed as a training for economic efficiency in everybody, since success crowned well-nigh every sincere effort. This theory of equality in efficiency was tried out in many types of enterprise, the military among the rest. We reasoned that a man who, without special education, had made a successful politician, would as a matter of course make a successful general. On this point John Fiske, the historian, has the following comments: —

"The old-fashioned American notion that a man who succeeds in one kind of work can succeed in any other by dint of native ability and without special training is not so commonly entertained now as it once was. It was a notion which, on the whole, did us credit; for it bore unconscious testimony to the quick wit and rare versatility of the American people. But the complicated conditions of modern life are beginning to show its fallaciousness, and the Civil War taught us some lessons in this regard. Of all the occupations of life, there is none in which the imperative of professional training is so forcibly demonstrated as in warfare, where errors of judgment are visited with such prompt and terrible penalties. Among the commanders in our Civil War on either

[1] Fiske, J., "The Civil War in the Mississippi Valley," p. 207.

side, nearly all who achieved success on a large scale were graduates of West Point, and most had served their apprenticeship in Mexico. On the other hand, our volunteer commanders who had had no special training seldom prospered in any higher position than that of general of division. There were one or two exceptions, but this was the rule."

2. Principles and Types

The old general efficiency sprang from the soil; the new vocational efficiency has a different source; namely, the training of mind and hand in the diverse industries that occupy mankind. Two topics of unusual importance now confront us: first, the ideals or general principles of vocational training; and second, its chief types and their characteristics.

(1) *General Principles of Vocational Education*

a. Motive. — Wealth of available knowledge often means poverty of educational motive. In primitive society learning is never detached from living, hence whatever interest there is in life is attached also to that which directly contributes to it. But now learning has progressed far beyond the possibilities of application for the individual. Who knows all about even a single subject, or can apply more than a fraction of what he knows? For years Professor Klein of Goettingen lectured on ad-

vances in mathematics. A dozen years ago or more he gave up the attempt as too strenuous for one man. Meagre as the literature of education confessedly is, there are a hundred thousand volumes upon it in the Bureau of Education at Washington. Every great university is ambitious to have a million volumes in its library. If these stores of inherited knowledge are to be absorbed by successive generations of students, so much of it must necessarily be detached from all practical application that the student is in danger of assuming a passive, indifferent attitude toward it, for the further knowledge retreats from the concrete world, the more it loses in vitality. Educational motives become vital as knowledge performs its functions in actual living. The more it is detached from life, the poorer its influence upon the student becomes.

Why are vital motives so often lacking in cultural education? Not because the knowledge there imparted is actually detached from life, but because it is so likely to seem so. But even this seeming detachment must be combated, and knowledge so selected, organized, and taught that its applicability to citizenship in its broader aspects may become daily apparent. But vocational education has the great advantage that what actually is true also seems so to the student. Yet, even this close relation of vocational studies to vocational occupations may be so obscured by bad organization and bad

teaching that the natural advantages of such courses may be partly or wholly sacrificed. This leads to the question of organization.

b. Organization. — Some minds take naturally to dualism. If two principles appear different in any way, it is at once assumed that they must be discreet; that is, separate and independent of one another. Education no less than philosophy has its dualists. Such persons say: "There is education for culture and education for vocation. They are different, but we need both, so let us run them either tandem or abreast as seems most suitable." The tandem philosophers insist that cultural education shall be finished before the vocational begins. This is, of course, a well-known position, and, for some classes of students, especially those who are preparing for the professions, has manifest advantages.

Those dualists who think to carry on cultural and vocational training together divide the time between them. A portion of the day, usually the first part, is given to cultural studies, and the remainder to practical work in manual training, domestic science, or what not. Thus, what nature would join together, art would keep apart. In such an organization dualism does its worst. But there is a monistic form of organization that promises better results, since it unites cultural and vocational aspects, insight and efficiency, into one organic whole.

Since technology is based upon the fundamental

sciences, the motto of the monist in education may well be, "A new astronomy from the old stars." This is, of course, figurative language and points to the reorganization that took place in astronomy when Copernicus proposed to change the centre of the solar system from the earth to the sun. In vocational education the centre of interest changes from vocation to vocation. We have one great body of fundamental knowledge divided into appropriate parts and represented by the various studies. These studies are all we have or need, but the matter from each must be chosen with respect to the calling it is to serve, so that what changes is selection and emphasis, not the studies themselves. Most higher professional education fully recognizes this principle. Chemistry, for instance, is needed in metallurgy, in sanitation, in many useful arts, in medicine, in domestic science and in agriculture, but after the basal facts of the science are learned, each school emphasizes those aspects of the subject that have most pertinence to the field in question. Medicine, agriculture, commerce, education, and the like have use for biology in its manifold forms, but selection and emphasis change with each.

The principle that the higher vocational education finds so useful is equally serviceable in the lower. There should be as many reorganizations of studies in vocational schools as there are distinct purposes. That such an ideal may be realized in practice can be seen from

the following extracts from the report of a technical high school:[1] —

(1) *Mathematics.* On the technical side the pupil articulates the mathematics with the work of the drafting room, shop, domestic science, and domestic art. Teachers of technical subjects are in constant touch with the mathematics department, anticipating problems which will arise and reporting immediately to that department any weakness shown by a pupil in problem or principle. The work during the first two years is given five times per week and involves arithmetic, algebra, plane geometry, and elementary trigonometry.

(2) *Industrial Geography.* This course is intended to give the student an introduction to the other sciences and furnish a background for the course in industrial history. The first term is spent on meteorology in its relations to industrial, social, and economic conditions of a people; the second on physiography; and the third on the industries of the various regions in their relations to climate and physiographical conditions.

(3) *Industrial History.* It is expected that the work in industrial geography and industrial history will prepare for the course in American history and civics, which includes the discussion of civic and industrial problems with a view to good citizenship. In the course in the history of arts, the principles underlying all the arts suggested in the course in English in the first two years, and illustrated in the courses in drawing and design, will receive added illustration in the study of arts, products, and processes of other periods of history and of industrial products and processes.

(4) *English.* In the teaching of English literature, the constant aim is to make clear the relation of literature to life. . . . The works of our great English and American industrial writers will have a prominent place in the course. The supplementary read-

[1] The Cleveland Technical High School.

ing will include much that is best in invention and discovery, manufacture and distribution, and the attendant industrial and labor problems. In composition much emphasis is laid upon exercises in original creation in one of the most beautiful arts. . . . Whenever practicable, the composition work is coördinated with the other departments of the school, thus interrelating and binding together the course of study.

(5) *Mechanical Drawing.* This subject is taught as the language through which the student learns to give graphic expression to ideas which he is later to work out in material forms in shop and workrooms. It is the one medium through which craftsmen are able to record, clarify, and perfect such ideas as may come to them.

(6) *Applied Arts.* As mechanical drawing is made the medium of expression in the shop, so is free-hand drawing in this department. Nature forms are studied and sketched in the plot, in detail, and in color. From these studies pupils derive conventionalized units which by repetition and grouping furnish motives for original ornamental designs and for suggestions of form, proportions, and color harmonies. These apply directly in constructive work, as in borders for garments, draperies, naperies, and in embroideries, in the decoration of pottery and leather work; and in the designing, decorating, and making of utensils and articles of household and personal use from various materials and fabrics. The work, therefore, correlates in very definite and practical ways with dressmaking, millinery, domestic science, and the mechanic arts and crafts, and with the many occasions in daily life in which an intelligent appreciation of fitness and beauty add greatly to vocational success or personal happiness.

(7) *Domestic Science.* The purpose of the work in this department is threefold: (1) to teach all subjects pertaining to the care and duties of a home; (2) to teach all theory relating to the above subject as applied science, that the girls may acquire intellectual development as well as practical skill; (3) to teach institutional cookery and kitchen management as trade subjects, that students

may be prepared for catering as a vocation. During the first year botany and physiology are among the required academic studies for girls. These subjects are therefore taught as applied sciences, and the theory connected with the practical work in cookery for the first year has a physiological aspect. Chemistry is one of the required subjects for the second year. The same subjects are considered and the same materials experimented upon in the chemical laboratory as in the school kitchen. For instance, if eggs are cooked in the kitchen laboratory, during the same week their composition and properties are ascertained in the chemical laboratory.

(8) Elementary physics is given the third year and is taught as applied physics with special reference to the problems of the shop rather than as mathematical physics.

These extracts are representative of the way in which the Cleveland Technical High School is consciously reorganizing the whole course of study in harmony with the leading purposes of the school. The programme of any other first-class vocational school in greater or less degree shows the same effort. A school of commerce will use the same studies, but it will adapt them to the commercial purpose, and so on through all varieties of similar institutions. Other things being equal, that vocational school ranks highest which most consciously and most successfully adopts the principle under discussion.

c. Creative Work. — One conception of education makes it consist mostly of passive absorption, on the one hand, and of bare imitation of physical processes, on

the other. In other words, the student is to remember what he is told, and to imitate what he sees done. Though it is freely conceded that memory and imitation have an important place in education, it cannot be conceded that they are education itself. When used as the sole instruments of training, they lack vital motive; they are too subjective and abstract; they fail to rouse the latent energies of the mind, to stir the imagination, to excite zeal and ambition. A passive education makes everything seem perfunctory and second-hand; its situations are artificial, rather than genuine; it leaves thought inert, for its inner resources are not utilized. If Jack is not a dull boy under such treatment, it is because his energies find other channels in which to flow. It is probably his games that stir his blood, and intercourse with family and friends that keeps his wit from stagnating.

The whole mental attitude of the youth changes, however, when he finds that he must make an active use of his mind in order to solve the problems that arise in connection with his daily work. When this is properly related to all studies in the curriculum that have any bearing upon it, then the new spirit permeates his whole school course. It is one thing to demand an isolated bit of ingenuity in constructing an article of furniture or a piece of pottery, or in designing a border, but quite another to solve a problem in materials that involves mechanical or free-hand drawing, the making of patterns,

the calculation of dimensions, the investigation of qualities, the acquisition of insight into art principles or the historical connections involved, and, finally, of adequate expression in English of aim, processes, and results. Such radiating interest warms his heart as sunshine warms the air. What is best amd most ideal in work, namely, its art aspects freed from economic pressure and benumbing routine, appeals with irresistible force to the spirit of youth. His response is immediate, whole-hearted, earnest, enthusiastic, continuous. To work is to live, to live is to work. The 'curse' becomes a blessing, a task is an opportunity, a problem well solved is an intellectual and ethical event. Art in this sense is truly, as Schiller thought, the bridge between sense and reason, which leads the youth from absorption in his own individual concerns to a realization of his relations to mankind. Education is no longer a revelation which the student is to absorb as a blotter absorbs moisture, but a wide-radiating insight coupled with equally extended practice in the objectifying of ideas in sense materials.

Vocational is not different from cultural education in the validity of this principle, but it enjoys the advantage of being more immediate, more concrete, and seemingly at least more closely connected with the most absorbing activities of a man; namely, those involved in earning a living.

When motives are vital, when knowledge contributes all that it can to the solution of each problem, and when creative productivity is the leading conception of school work, discipline takes care of itself, teachers are changed from policemen to friends, the school is a privilege, not a bore, and education itself is looked upon as one of the most interesting things in life.

d. Initiative and Skill. — It is easy at this point to fall again into dualism. Teachers desire initiative in the student, that inexhaustible fertility of resource that enables him to adapt himself to every change in condition. The employer, on the other hand, is thinking, not so much of the welfare of the student and his future growth, as of his present availability for the work in hand. It is skill, ready for use, and adequate to present needs, that the employer demands. Then the query arises: "Initiative or skill, which? You cannot have both." But here again the antagonism is more apparent than real. If the teacher will but broaden his conception of what constitutes initiative, and the employer but reflect what makes skill ultimately most valuable, it is possible to unite initiative and skill so that they shall be but two aspects of one process. Initiative without skill of execution is as barren of progress as is skill without initiative. A machine might be defined as instrument for work, devoid of thinking. It will do what it was designed to do, but nothing else. Even

when most intricate and effective, it is but a poor pattern of what a human being should be. A disembodied spirit might be conceived to be a wonderful thinker, a dreamer who has an all-seeing vision, but as such a being could only project great plans without the ability to execute them, his effectiveness in the world would amount to nothing. The student should become neither a machine of iron, nor a mere spirit of thought, but should through variety and versatility of skill acquire initiative and adaptability; or, reversing the order, he should, through applied insight, become efficient and versatile in skill. For example, this principle applied will lead to a knowledge of machinery, its principles and their manifold applications, rather than to an empirical understanding of one or more specific machines. It will insist upon a wide-reaching power of adaptability in using all kinds of machines, rather than a high but restricted degree of skill in a narrow field. One who is at home in machinery can understand one mechanical contrivance as well as another. He is not afraid to handle a gas engine, an electric dynamo, a Hoe press, a self-binder, or a steam engine, because his knowledge of applied physics is such that even a cursory examination will put him in possession of all necessary understanding, while a brief period of practice will make him efficient in execution. To such a man a new machine is a new joy, an interesting application of well-known principles. Age has

nothing to do with the mental and physical control of a man so trained, except to make him more proficient. A man of sixty is a better workman than a boy of eighteen, for he brings long years of experience to bear upon the mastery of the new problem.

The case is quite otherwise with the workman who has acquired skill in the manipulation of one machine, but who has no extended knowledge of machinery and no considerable range of practice in using it. A labor leader once sarcastically recommended that every laborer of fifty who lost his job should be shot, since he could only sink to lower levels of occupation, until misery made existence insupportable.

The school, therefore, must seek to impart fundamental knowledge of principles in all the vocations it seeks to prepare for, and it should secure a wide range of practice in application; not initiative alone, not skill alone; not skill in a single department of work, but such a degree of skill in many departments as renders the student adaptable, and versatile, and capable of quickly acquiring speed where speed is necessary. The shop of the employer is the place to acquire speed and adeptness. These qualities can be quickly attained when there has been the proper degree of preparation. Such an operator becomes increasingly valuable, whereas the one who has turned the school into a manufacturer's shop and has striven alone for adeptness and speed in a single depart-

ment becomes increasingly incapacitated for new applications of skill. Arrested development of mind and hand is a bar to future progress.

e. Thought-directed Routine. — Vocations differ in the character of the thought they invite and in the kind of skill they demand. Agriculture, heretofore, has imposed a routine, but has not necessitated very much thought. The farmer always knew he had a mind, but he did not greatly use it in his business. It was convenient for entertainment, but not essential in farming, since each stage of routine was fixed by tradition or by the season. There were no problems to solve, — only so much wheat or other grain to sow, to reap, and to thresh; so much corn to be planted, cultivated, and gathered; so many cows to milk or horses to feed or hogs to fatten and market. Now farming bristles with problems which demand long-time experiments to solve. These problems concern soil and its treatment, even to the extent of "ploughing with dynamite" for impervious hardpans; the selection of seed; the breeding of plants; fertilizing with manures, mineral substances, and leguminous crops; stock breeding and handling; poultry and pigeon raising; the development of fruit trees, small fruits, and the like; the utilization of old and the development of new markets; the possibility of pursuing extensive farming in the north during the summer and horticulture in the south during the winter.

Many have considered how children can be kept upon the farm. The solution is easy. All we have to do is to make farming interesting, so that it shall excite the imagination, stimulate the use of thought, and give promise of such financial return as shall put into possession of the young all the instruments of progress, — competence, comfort, education, and a satisfying social life. Under the stimulus of the new agriculture, boys organize into corn clubs and the like, and girls into canning and other clubs. One boy in South Carolina is reported to have raised 238 bushels and three pecks of corn on an acre of ground, and that in a state where it was supposed that Indian corn could not be successfully grown. Groups of girls in the same section raised and canned tomatoes and other garden product, and realized thereby some $400 per acre. When such results are attained, no other persuasion is needed to keep the children of the country at home, if only they are given a fair chance. Not infrequently it used to be the custom to let each child have an animal which it could call its own. If the animal chanced to be a female, say a heifer calf, and the child were permitted to own the increase, a hateful alternative soon presented itself, for the multiplying animals fed from the common stores soon threatened to absorb the whole substance of the farm. Then, what was given had to be taken away, causing grief and a sense of injustice. If the animal were a male, even then it must sometimes be

sold, after childish affection had fastened itself upon it. In any case, this kind of giving is wrong in principle, for it does not return to the child the rewards of his own initiative and enterprise. A much better plan is to assign him a plot of ground and encourage him to dream and scheme about it, to decide what he shall plant, and when and in what proportion, how fertilize, cultivate, and market. Such a procedure awakens all his dormant energies, fires his ambition for the future, and, best of all, lessens in no appreciable way the welfare of the whole group. Something has been created from surplus energies of mind and body that otherwise would not have existed.

Thus, farming, from being the most laborious and prosaic of occupations, has become one of the most interesting. The new agriculture, while not greatly developing manual skill, has enriched itself with all the resources of the mind. The combination of these two factors greatly enlarges all the possibilities of country life.

The relation of thought to routine is somewhat different in industrial and commercial pursuits. In the first place, while the farmer is the conductor of an enterprise, the worker in an industrial establishment must in general be an employee, who must do, not what his own sense of initiative may suggest, but what his employer directs. There is consequently far less opportunity for

trying out various projects that may present themselves to the mind. In the next place, the necessities of wholesale production tend to eliminate problems for the workman and to hold him for long periods of time to a fixed routine. True, he may experiment upon methods of speeding himself up by the elimination of useless motions, under the influence of what is called scientific management, but since this demands more resolution than reflection, it does not greatly enrich the thought-life of the laborer. There seems to be more place for thought in preparation for an industrial pursuit than in following it. But the consciousness of ability to secure advanced position is a spur to the mastery of routine of a given stage. Then if the business is so organized that promotion is possible when it has been fairly earned, the mind will not stagnate. If, however, promotion and its consequent change is not attainable, then production becomes a species of slavery, which surplus physical energy may render endurable even for years, but which loses to industry its greatest asset; namely, fresh, elastic thought, which is always seeking new worlds to conquer. If the currents of thought that ought to turn the wheels of business are directed to the whirligigs of pleasure, the loss to industry is not only great, but lamentable, since the riches it might enjoy are perhaps needlessly turned aside. Industry does indeed try palliatives such as profit-sharing, coöperation to the extent of rewarding useful

suggestions as to improvements in producing and marketing goods, the utilization of by-products, and the like. If in the nature of the case it is a sheer impossibility for a given type of manufacturing to employ the brains of its operatives, it may at all events help make life worth living by encouraging such avocations as will conduce to greatest efficiency and which will return to life that indispensable intellectual and emotional element of which the routine of the business deprives it. If thought cannot function except in a tedious routine, a man becomes an animal of an unhappy kind, because there is always the rebellious consciousness that he might be something better.

Commerce offers greater scope for individual initiative, since even the humblest salesman has the personal qualities of his customer to deal with. Each sale made is a psychological problem solved, and as such brings its own rewards. Each failure is a spur to future effort. For the proprietor or the head of a department the possibilities for the extension of the business, the increase in its profits, the decrease of its expenses through bad debts, preventable leaks, and the like, present an interesting and perpetually renewed set of problems that demand for their solution all the resources of thought, courage, and initiative. No merchant, and no employee of his, ever ought to stagnate, since thought and routine can be so perfectly blended in the day's work.

3. Types of Vocational Education

Vocational education may first be classed as higher, middle, and lower.

A. In the higher institutions of vocational training we have the following well-marked types: —

(1) Schools of law, medicine, theology, teaching, and civil service.
(2) Technological institutions.
(3) Commercial colleges.
(4) Agricultural colleges.

Germany has 22 universities embracing schools of the first type, including the study of agriculture; 11 of the second, as separate institutions; and 5 of the third. In the United States, it is common to find all four types combined under one organization, though some states have separate colleges for one or more of these higher schools.

B. Among the middle vocational schools we have the following types: —

(1) *Schools of Commerce.* — There are 429 independent schools of this kind in Germany. In the United States there are some 500 private commercial or business schools. While the number of separate public commercial high schools is small in the United States, the number of commercial courses in public high schools is very large.

(2) *Industrial Schools.* — These include trade schools and schools for the workers in manufacturing establishments. Germany, which has carried this kind of instruction further than any other country, has among her institutions for secondary industrial training the following schools: Textile industries, 103; art industries, 34; building and engineering trades, 52; metal industries, 12; woodworking industries 12; together with numerous miscellaneous schools for basket makers, glass-stainers, book-makers, photographers, tailors, musical instrument makers, toy makers, millers, book printing, innkeepers, gilders, ivory workers, cabinet-makers, tanners, etc.[1] In the United States, we have the following well-marked types of secondary industrial schools: (1) The separate or independent industrial schools, such as Drexel Institute, Philadelphia; the Armour Institute of Chicago; the Pratt Institute of Brooklyn; the Bradley Institute of Peoria. (2) The separate public technical high school as found in a number of our larger cities. (3) Industrial courses or departments in regular public high schools, which are very numerous. (4) The public trade school, such as the Milwaukee Public School of Trades for Boys. (5) The part-time co-operative industrial school, as at Cincinnati and other cities. (6) Evening and day forms of continuation

[1] Sykes, F. H., "Industrial Education," Teachers College Record, p. 18, September, 1911.

schools.[1] (7) Factory schools for the training of operatives.

(3) *Agricultural Schools.* — Germany has only 11 secondary schools of this type, showing that the agricultural educational interests lag far behind the industrial in that country. This is not surprising, when it is considered that during the past thirty years Germany has been undergoing a rapid industrial evolution. Besides, agriculture there had already left far behind her the crude robber farming that has been so characteristic in each newly opened section of the United States. So long as virgin soil was obtainable, it was easier to move to a new tract than to preserve the fertility of the old. Consequently the need for agricultural education in the United States has recently been more keenly felt than in the Old World.

Secondary agricultural high schools are springing up all over the country. Some are state-aided, some maintained by local taxation, while a host take the form of agricultural courses in public high schools. New York supports separate secondary agricultural schools at Alfred and at Canton. In other states the township, the county, or the congressional district may be the seat of such institutions. In Wisconsin agricultural

[1] For an excellent description of these types, see The Eleventh Yearbook of the National Society for the Study of Education, Part I, 1912.

schools are coeducational; the course covers a period of two years of eight months each; the state appropriates $4000 a year to each school; pupils must have completed the eight grades of the public school as a condition of entrance; students are admitted from outside counties.[1] Bulletin No. 242 enumerates some of the ways in which these schools are able to help the farmers: they prepare plans for farm buildings; make suggestions for remodelling old buildings; build forms for and supervise the construction of cement silos, watering troughs, and similar structures; test all kinds of dairy products; assist in the selection of farm animals; plan drainage systems; test seeds for germination; test cattle for tuberculosis; test soils; recommend systems of rotation. A prominent feature of these schools is the "part-time" work in agriculture, in which the student spends a part of his time in the school, and the remainder in productive farm work, preferably at home, under the supervision of the school. The outside work takes the form of problems, or "Projects" as they are called. These projects are classified as improvement projects, experimental projects, and productive projects. "Each project is something to be done on a farm, which would involve a limited and definite amount of equipment, materials, and time, and which would be directed toward the accomplishment of a specified and valuable

[1] See Bulletin 242, U. S. Dept. of Agriculture.

result."[1] Such projects are found in vegetable, flower or landscape gardening, orcharding, small-fruit growing, general farm crops, farm forestry, greenhouse crops, poultry products, bee-keeping, swine husbandry, sheep raising, horse raising, dairying, etc.

Another form of state aid to agricultural secondary education is the subvention of agricultural departments in public high schools. Such aid is given in Kansas, Louisiana, Maine, Maryland, Massachusetts, Minnesota, New York, North Dakota, Texas, Virginia, and Wisconsin. Doubtless such assistance will soon be extended in many other states. The amount of aid ranges from $250 to $1000, and in exceptional cases to larger sums.[2]

Besides these standard forms of secondary agricultural education, there are numerous short courses and extension courses by which knowledge is disseminated and guidance provided.[3]

C. In the field of lower vocational education, Germany has done more than any other nation, since she has organized a system of continuation schools for cities, which have all become established parts of the compulsory state

[1] Stimson, R. W., "The Vocational Agricultural School," in the Eleventh Yearbook, Part II, National Society for the Study of Education.

[2] Crosby, D. J., in Eleventh Yearbook of the National Society for the Study of Education, pp. 54–65.

[3] Perhaps the best general survey we have of the main types of secondary agricultural education is the Eleventh Yearbook of the National Society for the Study of Education, University of Chicago Press.

system. In the city of Munich alone, nine thousand boys attend these schools, twelve of which are general, and fifty-two trade schools. Seven thousand girls are distributed over forty separate schools. All receive instruction in household arts; nine hundred are in commercial classes, and three hundred in trade departments.[1] Similar continuation schools are maintained in England and in some other European countries.

In the United States an extensive system of public evening schools is to be found in the larger cities. Courses in the simpler aspects of manual training, and household activities, and, in rural districts, the rudiments of agriculture are frequently provided in the elementary schools. The state of New York has made a distinct advance in providing that the rudiments of knowledge and the school arts shall be so far advanced at the end of the sixth year of school life that the beginnings of vocational training may start in the seventh and eighth grades. This arrangement also permits other secondary studies, especially language, mathematics and science, to begin at the same time. This provision is sure to have far-reaching effects upon democratic education, for it gives us a chance to increase the efficiency of our secondary education while preserving its democratic character.

[1] Kerschensteiner, Dr. G., Bulletin 14, National Society for the Promotion of Industrial Education, p. 16. Also in Three Lectures on Vocational Training, p. 22, published by The Commercial Club of Chicago.

CHAPTER V

RACE IMPROVEMENT: EUGENICS AND EUTHENICS

I. Eugenics: its Educational Significance and Limits

The measure of eugenics is the selection of desirable natural characters; its means are breeding and elimination.

1. Conflicting Theories

No study is perhaps more fascinating to the teacher than that of heredity, for upon its laws depend the limits of the educability of the young. Though it may be a laudable effort to try to wash out the spots of the tiger, yet for all our trying the spots abide. The teacher desires to know to what extent he may soften or avert the fate of those who are born deficient in the fundamental attributes of normal mentality; he also wants to know where the boundaries are that may not be passed. Furthermore, he would like to know what the welfare of the possible future offspring of defectives demands in the way of public control, and what he can do to disseminate a knowledge of the truth and help it to prevail. The teacher is interested, moreover, in knowing to what

extent human beings may subject themselves, or be subjected, to the beneficent aspects of the laws of animal heredity, and, on the other hand, to what extent these laws are certain to be evaded. In other words, he wishes to understand how humanity may modify animal heredity, and whether, on the other hand, some laws of animal heredity hold with inexorable rigidity in the human realm.

The first great question among biologists is whether acquired characters are inherited or not; that is, whether a parent may transmit to his children say the muscular excellencies he may have acquired by work or play or gymnastics, or the immunity to disease that an outdoor life has given him, or the mental alertness that an active intellectual life may have developed in him. The Lamarckians maintain that acquired characters are at least partially inherited, while the Weismann school in general declare they are not. The latter base this denial upon the ground that all heredity comes through the germ-plasm, which is antecedent to all body-cells and their development. Lamarck's theory was published in 1809, long before the microscope had given any hints as to how heredity is effected in the embryo. "His theory was that 'acquired' modifications are being continually produced and perfected by every organism during its life, and that they are at least partially transmitted to its offspring, so that each generation will be

rather better adapted to its surroundings than its predecessor."[1] Though the followers of Lamarck are not so numerous as they once were, still they are a force in the scientific world. They say it is absurd to think that ages of development under a given environment, say Central Africa, have not produced fixed racial characteristics. They hold that the human organism is *one* for inheritance, and should not be divided into germ-cell and body-cell and all potency in heredity ascribed to the germ and denied to the body. They affirm that when pressed for reasons the Weismannites conceal themselves in the germ-cell; that is, in mysteries, where no man can find them. The latter reply that the germ-cells are segregated in the body long before birth, and that it is absurd to think that they can be changed in fundamental character by somatic or bodily changes, such as are induced by the environment. They maintain, moreover, that these cells, like every other thing in nature, have the internal quality of variability, which is enough to account for development. They reënforce this argument by describing a fairly complete mechanism of heredity which the microscope has enabled them to discover. The followers of Weismann therefore maintain that, like the monads of Leibnitz, these germ-cells have no doors or windows through which somatic changes can reach them.

[1] Doncaster, L., "Heredity in the Light of Recent Research," p. 120.

But the followers of Weismann divide into two camps when the question arises as to the way in which inheritance takes place.

The Mendelians think that many, and in a final analysis perhaps all, hereditary characters are unitary, or independent, in kind, and that when germ-cells divide, these unit characters distribute themselves through the chromosomes in an alternate manner;[1] accordingly inheritance may be duplex (from both parents, as when both are brown-eyed), simplex (from one parent only, as when one is brown-eyed but the other devoid of pigmentation in the eye), or nulliplex (from neither parent, as where neither has the pigment that produces the brown in the eyes). A prominent character is also often called *dominant* and its opposite *recessive* (*e.g.* if *tall* is dominant, *short* is recessive), the main point being that through breeding either character may become isolated and fixed, so that a strain may be produced that will always come true to kind; as, for instance, a breed of wheat or corn that will ripen in a cold climate having but a short summer; a breed of chickens which, like the White Leghorn, become great egg producers, but show small desire to incubate. The agriculturist now applies the laws of Mendel successfully in the breeding of nearly all varieties of plants and animals. The great success of Luther Burbank in the plant world is well known. In

[1] See "Mechanism of Heredity" below.

the human field, Dr. Goddard shows from his investigations on the heredity of the feeble-minded, at Vineland, New Jersey, that if both parents are feeble-minded, all the children will be, and that if one parent is feeble-minded, *some*, if not all, of the children most probably will be.[1]

On the other hand, the *biometricians*, as they are called, led by Galton and Pearson, doubt the validity of Mendel's laws in the human family, at least in some aspects of heredity, and explain human heredity as a process of *blending*, as in the case of height, form of body, color of hair and skin. If Mendel's laws held absolutely in the human field, we should be able to segregate the white in one strain (dominant) and the black (recessive) in another when cross-breeding between whites and blacks takes place, but who has ever seen anything of this sort? What we seem to have is a *blending* of color in varying shades according to the amount of white or black blood in the mixture.

Other writers, like Walker,[2] accept both blending and alternate inheritance as modes of transmission. Walker[2] says: "It appears that we have two opposite modes of transmission: one in which certain characters are definitely segregated (Mendelism), and for which it is necessary to assume entities which are distributed in an

[1] See below, p. 96.

[2] Walker, C. E., "Hereditary Characters and their Modes of Transmission," ch. X, Edward Arnold, London.

alternate manner to the gametes (the reproductive cells in either parent) when new individuals are produced; another in which characters apparently blend when crossed."

"The whole problem," says Doncaster,[1] "is very insufficiently known, and the difficulty of obtaining reliable data is doubtless increased by race-prejudice. Taken in mass, the results of crossing white and black races seem to give a blended inheritance with continuous variation."

Again certain other biologists, like Dr. F. A. Woods,[2] whose eyes are fixed almost exclusively on hereditary processes, make heredity the main factor in human improvement and think the environment of small consequence. Others like Saleeby[3] and Davenport[4] and Jordan[5] ascribe a large influence to both.

Still others, economists like Patten, Devine, and Rountree and Lasker, lay the chief stress upon the environment. Each of the foregoing positions will be discussed and, so far as seems appropriate, evaluated in the present chapter.

[1] Doncaster, L., "Heredity in the Light of Recent Research," p. 110.

[2] Woods, F. A., "Mental and Moral Heredity in Royalty," Henry Holt & Co., New York, and "Recent Studies in Human Heredity," *Amer. Nat.*, Vol. 42, p. 685.

[3] Saleeby, C. W., "Parenthood and Race Culture," London, Cassell & Co.

[4] Davenport, C. B., "Heredity in Relation to Eugenics," ch. VIII, New York, Holt & Co.

[5] Jordan, D. S., "The Heredity of Richard Roe," p. 35, Boston, American Unitarian Association.

2. The Mechanism of Heredity

Encouraged by the surprising results obtained by plant and animal breeding, scientists are now led to inquire to what extent similar results are attainable in the human family. Manifestly great differences exist between a human and an animal economy. Thus, plants and animals are controllable by forces outside themselves and may be selected or destroyed at the will of man; but human beings are ends in themselves, control in large measure their own destiny, and cannot be selected or destroyed at will, yet they are nevertheless organized into social groups which can to a certain extent exert an influence on selection and elimination, as, for instance, where feeble-minded persons are segregated in institutions and prevented from producing offspring.

The reader of eugenic literature constantly meets such terms as germ-cells, somatic cells, mother and daughter cells, unit characters, chromosomes, centrosomes, determiners, duplex, simplex, nulliplex, dominant, recessive, etc., besides the older expressions, natural characters and acquired characters. To comprehend these distinctions and to understand the premises from which the eugenist draws his conclusions, it is necessary for the student to understand at least in outline the mechanism of heredity as revealed by modern research.

In the early days of the theory of evolution, men as-

sumed two things: namely, first, a tendency to variation; and second, a power to transmit these variations to offspring. Without variation there could be no progress, since the descendants would be precisely like the parents; without the power to transmit variations there could likewise be no progress, for the variations would disappear with the individual that produced them. But knowing nothing of nature's method of transmitting characters, it was often assumed that qualities acquired in the body (the somatic) cells, say in the muscles, could be transmitted directly to the offspring. Thus arose the doctrine of the inheritance of acquired characters.

Now, however, it is definitely known that the whole mechanism of heredity lies in the germ-cells, and not in the cells of the body. Therefore it is necessary for the believer in the inheritance of acquired characters, whether mental or physical, to show that, and eventually how, these characters affect the germ-cells. That there is some connection between germ and somatic cells is evident, for it is from the body that the germ-cells must get their nutriment, while it is certain that when the body dies, all germ-plasm likewise perishes. But, on the other hand, it is easy to see why mutilations are not inherited, since the tails and ears of dogs, for example, can hardly be so closely connected with germ-cells as to cause the puppies to be born with cropped ears and shortened tails. Yet it is at least conceivable that

poisons circulating in the blood or paralyzing the nerves might so affect the germ-cells that deterioration in the offspring would take place.

At all events, it is evident that the eugenist holds the key to the problems of heredity when he concentrates his attention on the known mechanism of heredity found in the germ-cells, a brief outline of which follows: —

(1) *Protoplasmic or Germ-Cells*

These are of two kinds, the female (egg) and the male (sperm). Though differing in size, the egg being much the larger, each of these cells multiplies by division. A cell consists of a nucleus within a mass of protoplasmic matter. Within the small mass known as the nucleus there is a smaller body known as the plasmosome or true nucleus, and another known as the net-knot, or chromatin nucleolus. Surrounding these two points, yet within the nucleus proper, is an irregular network of denser material known as the chromatin network. Outside the nucleus lies a small so-called attraction sphere containing a centrosome. Figure 1 is a diagrammatic representation of a resting germ-cell.

(2) *Division of a Mother Cell (Male or Female) into Two Daughter Cells*

In the process of division the single centrosome of the resting cell which lies outside the nucleus separates into

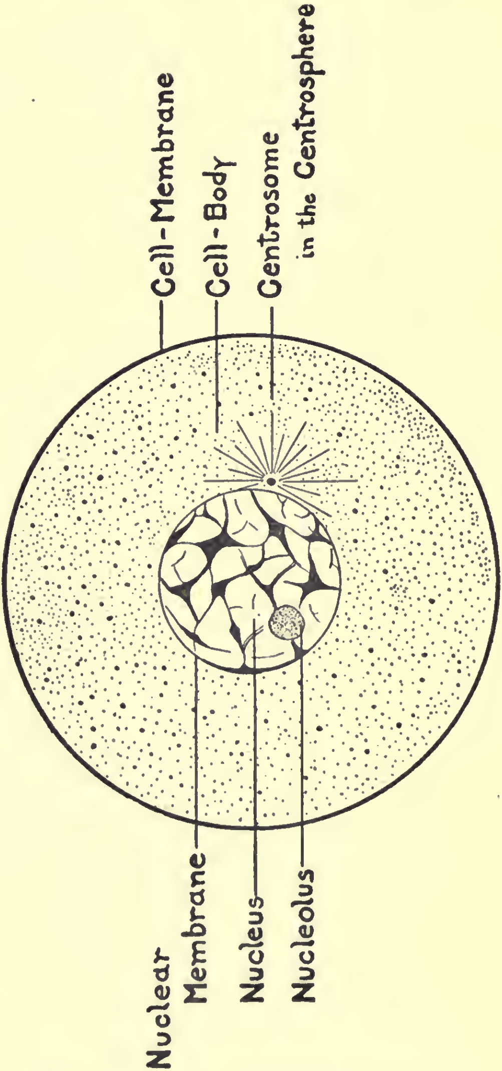


FIG. 1.—Diagram of a Resting Germ-Cell.

two centrosomes when the cell is ready for division, which then move around to opposite poles of the nucleus, while the chromosomes arrange themselves at right angles to the axis joining the centrosomes. Later the line of chromosomes splits into halves longitudinally and then breaks into parts laterally, one-half going to each of the new centres. Finally, there is a line of cleavage between the centres, so that what was one cell has become two, each one of which is an exact counterpart of the original. It is in this way that nature multiplies germ-cells in both parents. See Fig. 2.

(3) *Determiners*

Though it is perfectly evident that the fertilized germ-cell does not contain in miniature the various organs of the adult, yet it is nevertheless destined to produce them. The various characteristics that go to make up the developed animal must therefore be represented in some way in the germ-plasm. One fertilized egg develops into a bird, another into a snake, a third into a mammal, and so on in endless differentiation. There must, therefore, be internal differences of one sort or another to correspond to all these differences in the final results of development. These differentiating elements in constituent parts are called *determiners*.

Determiners are located, then, certainly in germ-cells, and, according to recent research, most probably in

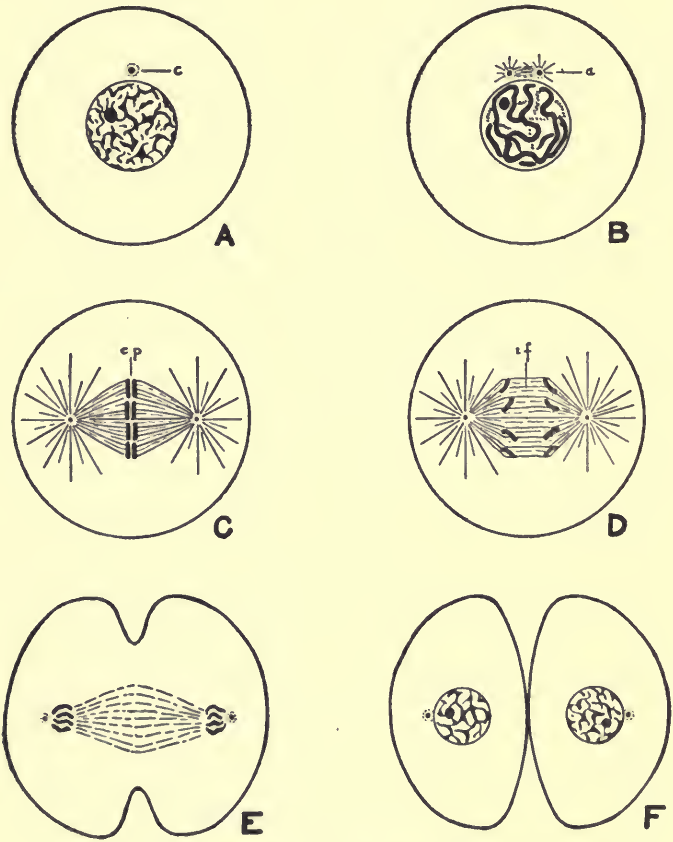


FIG. 2.—Development of a Mother Germ-Cell.

the chromatic material (the chromosomes) of the nucleus.

The inherent probability is that determiners come both from the egg cell and from the sperm cell, since offspring show characteristics of each parent, but since the amount of chromatic substance is the same in each cell, it seems clear that the chromatic substance (the chromosomes) must be the carrier of the determiners.

(4) *How the Doubling of Determiners is Prevented*

Since the determiners from the male germ-cell are added to those of the female, it would seem that the number of determiners would double with each succeeding generation, were this not in some way prevented. A mechanism to effect this prevention is found in the maturing of the germ-cells.

It might be supposed that germ-cells are capable of multiplication at any stage of their development, but such is not the case, for, starting with a primordial germ-cell inherited from ancestors, each cell created by subdivision pursues a regular course of further subdivision, then of growth, and finally of a fourfold multiplication and complete ripening. This is the end of separate development for the male or the female germ-cell. The cell is then ripe, like a mature fruit, and can find further existence only when joined to its opposite, a ripe cell of the other sex; that is, only in a fertilized egg.

In the process of *mitosis*, or mitotic division, as it is called, the germ-cells have each had, say four chromosomes, which it will be remembered are supposed to be the bearers of the *determiners* of the characteristics of the offspring, but in the final division that results in the mature cell this number is reduced by one-half, so that if the mother cell had four chromosomes, the ripe daughter cell has but two. Thus when the egg is fertilized each parent cell has contributed as many chromosomes as the other; namely, one-half of the original number, hence as many determiners, so that the doubling of determiners with each new generation has been prevented.[1] This is the mechanism of heredity, and the basis for the laws of Mendel.

3. Mendel's Law [2]

Mendel discovered that in the breeding of peas certain characters, like height and color, depend upon the presence in the germ-cells of determining factors behaving as units. In any given germ-cell each of these determiners is either present or absent. Thus in the case of a tall pea vine the factor tallness may be symbolized by *T* and is called *dominant;* in a short pea vine the absence of the determiner for tallness is called recessive and has *t* for its symbol. Tallness being due to a

[1] Consult Wilson, E. B., "The Cell in Development and Heredity."

[2] Mendel, Gregor J., an Austrian Augustinian Abbot, 1822–1884. The law was discovered in the breeding of peas.

factor *T*, a tall plant arising from the union of two germ-cells, a male and a female cell, both bearing this factor, is *TT*; a dwarf, being without *T* in either cell, is *tt*. Crossing the tall pea with the dwarf, hybrids, or cross-breeds, result with the symbol *Tt*. This is called the first filial generation (F). In the formation of the germs of these cross-breeds a process of segregation occurs so that germ-cells, whether male or female, are produced of two kinds, *T* and *t*, in equal numbers. The *T* cells bear the factor "tallness"; the *t* cells are devoid of it. *T* and *t*, being thus alternative, are called *allelomorphs*. The offspring, generation F_2; which arise from the chance union of these germ-cells in pairs, according to the laws of probability, are therefore on an average in the following proportions: 1 *TT* : 2 *Tt* : 1 *tt*.

Frequently the form *Tt* cannot be distinguished from *TT* because of what is called the *dominance* of the factor *T*. Thus it sometimes happens in the case of one normal and one feeble-minded parent, that the *dominance* of the normal parent may be so great that all the children will appear normal though some may have in latent form the taint of feeble-mindedness.

In the crossing of tall and dwarf peas, generation F, containing only the form *Tt*, consists only of dominants (tall plants), and generation F_2 consists of three dominants (1 *T* 2 *Tt*) to one dwarf (*tt*), which, displaying the feature latent in F, is called recessive.

Such qualitative and numerical regularity has been proved to exist in regard to very diverse qualities of characters which compose living things, both wild and domesticated, such as colors of flowers, or of eyes, patterns, structure, and power of resisting certain diseases.

When a character comes from both germ-cells, it is called *duplex;* when from one parent only, it is called *simplex;* and when it is lacking in both parents, it is lacking also in the offspring, and is called *nulliplex.*

An illustration may be taken from the crossing of red (dominant color) with white (recessive with respect to red) flowered four-o'clocks (*Mirabilis jalappa*). The offspring from this cross having the determiner for red from one side only, produced pink flowers only. In the first filial generation (F) when these pink flowers were bred together, they produced plants of which one in four had red flowers (duplex), two in four had pink flowers (simplex), while one in four had no red pigment (nulliplex).[1]

Since each parent may be either duplex, simplex, or nulliplex with respect to a given characteristic, say a pigment in the iris of the eye, it follows that there will be six more or less distinct classes of combinations with corresponding results. Taking the color of eyes

[1] Compare Davenport, C. B., "Heredity in Relation to Eugenics," p. 17.

as an illustration, Davenport[1] arranges the table as follows: —

Case	One Parent	Other Parent	Offspring	Characteristics of Offspring
1	PP	PP	PP, PP	All with pigmented iris (brown-eyed)
2	PP	Pp	PP, Pp	All pigmented, but half simplex
3	PP	pp	Pp, Pp	All pigmented and all simplex
4	Pp	Pp	PP, Pp, pP, pp	¼ duplex pigmented; ½ simplex; ¼ unpigmented (blue-eyed)
5	Pp	pp	Pp, pp	½ simplex; ½ unpigmented (blue-eyed)
6	pp	pp	pp, pp	All unpigmented (blue-eyed)

4. Application of the Laws of Heredity to Eugenics

The laws of inheritance for unit characters are so plain that it might seem an easy task to prescribe just what must be done to secure a desirable character in offspring or to eliminate an undesirable one. But as Davenport[2] points out, two internal difficulties confront us when we attempt to apply the rules of heredity to eugenics: first, "We do not yet know all the unit characters in man;

[1] See pp. 18–19.

[2] Davenport, C. B., "Heredity in Relation to Eugenics," p. 24. Henry Holt and Co., New York.

and, second, we can hardly know in advance which of them are due to positive determiners and which to the absence of such." Furthermore, unit characters may be simplex or duplex, which further complicates their determination.

What may at first seem like unit characters, may turn out to be a number of separately inheritable factors influenced by external circumstances. Thus, insanity may be the result of one or more of a large number of internal conditions combined with such external ones as isolation, trouble, overwork, wounds, blood-clot, sickness, or nervous weakness in general. Much the same variety of causes of criminality is revealed by analysis. In what sense is there any born criminal? The chief external difficulties in the application of breeding and elimination to human beings have already been mentioned. They are, that men are ends in themselves, control mostly their own destiny, and cannot be bred or eliminated at the will of others. These facts are modified by a certain measure of social control that can be exerted over marriage and communicable diseases.

The educational significance of the modern eugenic movement would appear to be confined mostly to the influence education may have on the following aspects of the problem: —

1. The elimination of the feeble-minded, criminalistic, and other undesirable classes.

2. The multiplication of the mentally and physically supernormal.
3. The spread of knowledge concerning eugenic laws.

Taking these points up in turn, we have to consider

1. THE ELIMINATION OF THE WEAK

(1) *The Mentally Defective*

The first law of inheritance of mental ability is that two mentally defective parents will produce only mentally defective offspring. This law has been abundantly verified by Dr. H. H. Goddard by the study of many family histories of feeble-minded persons at the Vineland (N. J.) Training School for Defectives. A low degree of mentality is due to some defect in this particular in one or both of the parents. Where both parents are lacking in some factor that determines normal mental development, the same factor will be absent in their children. The following charts by Dr. Goddard fully illustrate this law. They also show that if one parent is defective, some of the offspring, either in the first or second generation, are almost sure to reveal the defect. In these figures, the squares represent males and the circles females.[1]

Criminality is in some cases closely associated with

[1] See Goddard, H. H., "The Kallikak Family," for more detailed study of inherited feeble-mindedness. The Macmillan Co., New York.

feeble-mindedness; at other times the defect is of a different character, since the criminal is intellectually

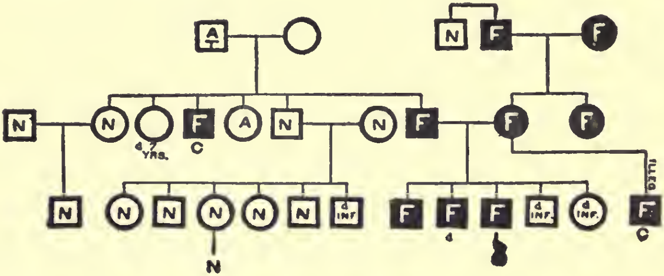


FIG. 3. — Pedigree chart illustrating the law that two defective parents have only defective children. *A*, Alcoholic; *C*, criminalistic; *D*, inf., died in infancy; *F*, feeble-minded; *N*, normal, *T*, tubercular. GODDARD, 1910.

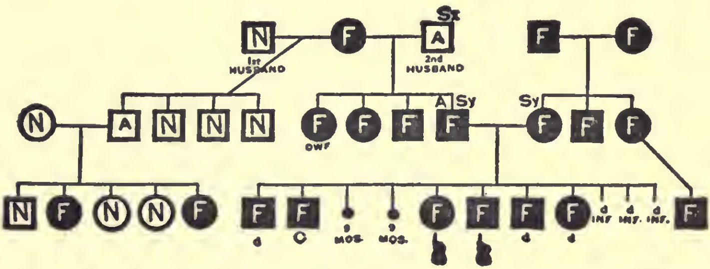


FIG. 4. — Here a feeble-minded woman (of the first generation) has married a normal man and has 4 normal children (except that 1 is alcoholic); then she marries an alcoholic sex-offender (who is probably also feeble-minded) and has 4 feeble-minded children. Here the mental strength of the first husband brought the required strength into the combination, so as to give good children. GODDARD, 1910.

strong and comes from parents who rank high in this respect. Davenport gives the history of a number of

families in which one or more of the children or grandchildren manifest criminalistic traits.[1]

(2) *The Ethics of Elimination*

Does the right to live imply the unrestricted right to propagate life irrespective of public welfare and the physical and mental health of offspring? There are several reasons why modern peoples need to ask and answer this question. Europe must ask it, because the New World has for four centuries steadily drained the best blood of her laboring classes, leaving so far as possible the dregs behind. But the dregs of society are more prolific than the higher classes. During the nineteenth century the population of Europe rose as follows: Russia from 38 to 105 millions; France from 26 to 38; Germany from 23 to 55; Great Britain from 15 to 40, and the United States from 5 to 75 millions, respectively. Again, modern hygiene is tending to bring even very inferior human beings up to and through the reproductive period, while prudence and the increased cost of living is delaying marriage and otherwise restricting the birth rate among those classes from which we should expect the soundest offspring and the best training. Furthermore, the very conception of progress in race improvement implies the replacement of lower life by higher, and surely it cannot be gainsaid that the germ-cells of the

[1] Davenport, C. B., "Heredity in Relation to Eugenics," pp. 83–92.

higher order have as much right to existence as those of the lower. Hence selection in parenthood on this ground at least seems justifiable.

Science is indeed making it possible for the earth to support thousands, where it once supported hundreds. Yet we can never for long escape the antithesis between the fit and the unfit. Were we in the midst of an animal economy, this would not matter, since the unfit would soon perish and the fit survive. But as things are now, we feel in duty bound to protect and nourish the one as much as the other, hence the modern problem of exercising charity while improving the race.

Saleeby [1] formulates what seems the true solution as follows: "*We must seek to preserve all the children that come into the world, to amplify the health of the healthy and to neutralize, as far as possible, the unfitness of the unfit, but at the same time while extending to the unfit all our sympathy we must forbid them parenthood.*"

"I submit, then," he says, "that there is no inconsistency in fighting simultaneously for the preservation and care of all babies and all children without discrimination of any kind — and, on the other hand, in declaring that, if the degeneration of the race is to be averted, still more if racial progress, which is the only sure prog-

[1] Saleeby, C. W., "Parenthood and Race Culture," pp. 27–28. Moffatt, Ford and Co., New York.

ress, is to be attained, we must have the worthy and only the worthy to be the parents of the future."

This means that we must deny parenthood to the pauper, the idiot, the imbecile, the feeble-minded, the epileptic, the congenitally criminal, and to those who are afflicted with destructive contagious diseases. The ethical reason for the prohibition of parentage to these defectives is twofold: —

1. The prevention of incurable misery or inferiority in the offspring, and

2. The protection of society from needless deterioration and the bearing of unnecessary burdens.

To the living we owe all possible love and protection, but it is likewise the duty of the living to deny parenthood to all whose possible offspring would be condemned to hopeless inferiority of body or feebleness of mind.

David Starr Jordan [1] gives a striking example of the good that may come to a country by denying parenthood, even for a single generation, to those whose offspring are sure to be imbecile in mind as well as diseased in body.

In the valley of Aosta, in northern Italy, and in other Alpine regions is found the form of idiocy known as *cretinism*. All cretins are afflicted with goitre, though not all who have goitres are idiots. These cretins have

[1] Jordan, D. S., "The Heredity of Richard Roe," pp. 92–98.

for centuries received ample support in alms, and, owing to this fact and the fact that the healthy peasants have been largely drafted off for the army, have until recent times greatly increased in numbers. Jordan, writing in 1897, says: "In fair weather the roads about the city are lined with those awful paupers — human beings with less intelligence than the goose, with less decency than the pig. The asylum for cretins in Aosta is a veritable chamber of horrors." He continues: "In 1910, I visited Aosta for a further study of this question. To my surprise I was unable for some time to find a single cretin or even anybody who knew the meaning of the word. I found that some twenty years ago Aosta had built an asylum for the aged poor. All the cretins and most of the goitrous in this region have been removed to this asylum, the men segregated from the women and the inmates not allowed to marry. *There is but one cretin left*, an old woman four feet high, who has the intelligence and, for that matter, the manners of a lap dog, very affectionate, but without any mental capacity. There were three others, half cretins, illegitimate children of cretin women. As regards the cretin children, Suor Lucia, the Mother Superior, said simply, 'Il n'y en a plus (They don't come any more).'"

If careful segregation of defectives for twenty years can rid a community of a repulsive form of idiocy that has afflicted it for centuries, what possibilities for us

(in similar fields) are brought to view! We have in this country 42 institutions for the feeble-minded, 115 schools and homes for the deaf and blind, 350 hospitals for the insane, 1200 refuge homes, 1300 prisons, 1500 hospitals, and 2500 almshouses. In these institutions are 300,000 insane and feeble-minded (75,000 feeble-minded in institutions out of 150,000 in the United States), 160,000 blind or deaf, 2,000,000 that are annually cared for by hospitals and homes, 80,000 prisoners, not to mention the thousands of criminals who should be in prison, but are not, and 100,000 paupers in almshouses and out.[1]

By no means all the inmates of prisons, insane asylums, and institutions for the deaf and dumb should come under such eugenic restrictions as were imposed at Aosta, but many of them should, while nearly all the inmates of asylums for idiots, epileptics, feeble-minded, and paupers should unquestionably be denied parenthood. Any pauper in the reproduction period of life is practically sure to have defects of mind and body such as unfit him for responsible parenthood.

Where the defect is physical rather than mental, education of the afflicted in the principles of eugenics, as in deaf mutism, would seem to be the best and possibly the sufficient means of preventing unsuitable marriages.

[1] Consult Davenport, C. B., "Heredity in Relation to Eugenics."

(3) *Influence of Education in the Elimination of Defectives*

Though it may be freely conceded that in its narrower aspects education has but slight influence upon eugenics, yet there are some ways in which its influence may be considerable. Among these are: —

a. The creation of a wholesome public opinion through instruction in physiology and hygiene. When it is established and make known that certain physical or mental defects are sure to appear in the offspring, like cretinism in the Alps or idiocy and feeble-mindedness here, and that these defects rob the afflicted creature of about all that makes existence desirable, then public opinion will demand, secure, and enforce those restrictive measures which, without cruelty to the individual, will forbid parenthood to him.

b. The discovery, through mental and physical tests, of incurable weaknesses. These tests should be supported by studies in the hereditary history of the individual.[1]

c. The segregation of the sexes in institutions for the education and protection of patients hopelessly deficient in physical or mental power.

[1] For Simon-Binet and other tests, see Whipple, G. M., "Manual of Mental and Physical Tests," pp. 469–517. Warwick and York, Baltimore, Md.

2. THE SELECTION OF THE STRONG

(1) *Nietzsche's Superman*

The "*will to power*" is, according to Nietzsche, the supreme measure of that bright blossom of the century plant of mankind, the *overman*, the supernal individual, for whose production the world of common men exist. "Man," he says,[1] "is a rope between the brute and the overman, he is not an end or goal, but a bridge." Kant thought that *every* man should be conceived as an end in himself, but with Nietzsche there is but *one* end, the great individual, and *men* are nothing but means for the realization of this dynamic personality. Nietzsche would not destroy the weak, he would use them, though he despises them. He has only scorn for a race of men who worship the mediocre, who believe in democracy and equality. "*Why do the weak triumph?*" he asks. "On the whole the sick and the weak have more sympathy and are more 'human'; the sick and the weak have more intellect, and are more changeable, more variegated, more intellectual — more malicious. . . . The sick and the weak have always had fascination on their side; they are more *interesting* than the healthy; the fool and the saint — the two most interesting of men! . . . And finally, woman! One-half of mankind is

[1] Nietzsche, F., "The Will to Power," pp. 299–300.

weak, chronically sick, changeable, shifty — woman requires strength in order to cleave to it; she also requires a religion of the weak which glorifies weakness, love, and modesty as divine; or, better still, she makes the strong weak — she rules when she succeeds in overcoming the strong. Woman has always conspired with decadent types, — the priests, for instance, — against the mighty; against the strong; against men."

With Neitzsche, as with Schopenhauer, the *will* is the supreme faculty, not so much the will to live, as with Schopenhauer, but the will to do, to be strong, to bid defiance to every influence that shears men of their power in order to make them 'good' or alike. The supreme purpose of the world is to produce such men of strength, and the offering is not too great that sacrifices any number of common men to produce one such demigod. As the final purpose of the world is not to bring goodness, but strength, such individuals stand above the morality of the mob and become a law unto themselves. "*What is the root of all evil?* — that the slave morality of modesty, chastity, selfishness, and absolute obedience should have triumphed. Dominating natures are thus condemned (1) to hypocrisy, (2) to qualms of conscience; creative natures regarded themselves as rebels against God, uncertain and hemmed in by eternal values." [1]

[1] "The Will to Power," p. 309.

Struggle, war, passion, envy, hatred, and rivalry are, then, the fiery furnace in which the great man is forged. "The 'warm sympathetic heart' does not know what it asks when it demands the removal of this violent phase of life; its own warmth is the product of the fire of the very passions which it desires to have suppressed."

The church, he thinks, has spoiled some good things that go to the making of the superman. Among them are: 1. *Asceticism*, which has been used for suppression of *desire*, when it should be used for the development of power of will; 2. *Fasting*, which should be used to enhance capacity, has been used as a penance for sin; 3. The *monastery* should be not an escape from temptation, but a storage reservoir for more powerful action; 4. *Feasts*, — these are pagan things, which mean: pride, high spirits, exuberance; scorn for all kinds of seriousness and Philistinism; a divine saying of yea to one's self, as the result of physical plentitude and perfection.

The superman, therefore, grants to himself all privileges when these help to express his superiority; he subjects himself and others to all discipline and hardship when these are necessary to his development or manifestation. Power, not goodness, is his morality; his destiny is to develop and assert himself, not to serve others. Democracy is the consolation of little minds. "Equality of rights leads to equality of wrongs. Every right is a privilege." "Equal rights to equals — unequal

ones to unequals, that would be the true doctrine of justice; and what follows from it — never to make the unequal equal." Nothing counts but the desire for life, for power. Instinct, desire, will, are higher than conscious intelligence.[1]

We are to breed, therefore, the lion, the bear, and the wolf. If we ask, "to what end?" the answer is, for the sake of the power they embody, for the strength of will they manifest, for their disregard of everything Christianity cherishes, and their contempt of the people from whom they sprang, over whom they domineer, and whose lives and substance they consume. If the superman has any end outside himself, it seems to be the production and recognition of his kind. That there can be many such Nietzsche does not intimate, though he says: "The only nobility is that of birth and blood. . . . Intellect alone does not ennoble; on the contrary, something is always needed *to ennoble intellect*. What is needed, then? — Blood." In short, he uses a wilderness of words with interminable repetition to describe his hero and the world in which he lives, but he does not show us biologically either how to get him or how to keep him when he is once obtained. "Would you have a name for my world? A solution of all your riddles?

[1] For an illuminating exposition of the doctrines of Nietzsche, see Thilly, F., "The Philosophy of Frederick Nietzsche," *Popular Science Monthly*, December, 1905.

Do you also want a light, ye most concealed, strongest, and most undaunted men of blackest midnight? — *This world is the will to power* and nothing else."

(2) *The Breeding and Preservation of the Strong*

The strong man is hard to get, and harder to keep. He is hard to get for several reasons. First, there is no social or other machinery for selecting and mating the kind of parents most likely to produce such offspring, even were any wise enough to be able to select them. Mankind cannot be bred as farmers breed animals or botanists plants. Second, the fortunate conjunction of germ-cells capable of producing a Lincoln, a Shakspeare, or a Napoleon is a matter so fortuitous that the chances of effecting it are as one to millions.

But hard as the supernormal man is to get, he is still harder to keep, for if Mendelism is true, there is no knowing what ancestral traits may be latent in the determiners of the germ-plasm, or what chance of fate may prevent the strong elements in his heredity from prevailing. Again, no sooner does a man become a lion than he is possessed to choose a lamb for his mate. The union of a lion and a sheep, however, does not produce a new generation of lions.

Nietzsche's theory is nothing new. The world has fortunately emerged from the state in which there were but two classes, the strong and the weak, the exploiters

and the exploited, the tribute takers and the tribute givers, the heroes and the herds. Such a condition of society was created and maintained by chronic social deficit. When the masses are on the threshold of starvation, the strong man finds his opportunity, since the people are so weak that they cannot survive without him, and so helpless that they cannot resist his will to devour them. The flock does indeed need the shepherd to keep off the wolves, but they cannot successfully resist shearing, or eventually being turned into mutton. It is doubtless weakness that makes submerged masses cultivate the sheeplike virtues prized by shepherds in their flocks — meekness, humbleness, non-resistance, tractability, patience in bearing pain, and willingness to suffer for the good of leader or led. But an economy of surplus has deposed the wolf from his position as leader and guardian of the flock. Nietzsche sees in the democracy made possible by an age of social surplus a conspiracy of the sheep to restrain the strong, to pull him down to their own level, and to exalt mediocrity. He sees in the church an organization to impose upon the powerful the very morality begotten by the weak for their own comfort and spiritual welfare.

There is, however, a less gloomy view of the social ferment introduced by prosperity. The superman, as Nietzsche is fond of pointing out, considered himself as a divinely appointed shepherd of the sheep, who were

taught to regard him rather than themselves as the ends of their being. But prosperity makes a new philosophy possible in that the prosperous man ceases to look for his end in his shepherd, only to find it in himself. Thus every man may aspire to strength, and to found a society in which each individual has the right and can find the means to develop to its utmost every germ of power and worth that heredity has given him. Children, therefore, do not inherit what their parents do, but what they might have become; democracy, therefore, should not be regarded as the leveller of mountain peaks, but the agency for raising submerged plains into air and sunshine. The satirist pictures Englishmen as exclaiming, "The meek shall inherit the earth; *we are the meek.*" This merely means that those who were the meek under the old reign of deficit and its morality of helplessness have become the strong, not by virtue of mere numbers directed by envy, but because of the development of the possibilities lying latent in the individual.

Society needs strength in all its people; it needs the strength to develop strength in the young; to restrain the strength of the strong when they insist upon being irresponsible gods, whether this assumed divinity manifests itself in the warrior, or in the priest, or in the industrial giant who would seize and devour everything upon which he can lay his hands.

The function of the strong man is not, as Nietzsche thought, to travel in a circle about himself, to make his own capricious capacity the end and aim of its own being, nor is it to beget a race of godlets like himself; it is, on the contrary, to use his power to develop power in others, to improve mankind, not to devour it; to elevate the race, not to be an elevation above it.

The conclusion of the matter seems to be as follows: The great personality has small prospect of becoming the progenitor of a race of intellectual or volitional giants; the race resists the effort to raise it above itself, but it does rejoice now and then in producing an isolated character of unusual strength. To make the greatness of the great man its own end, is to make an end of that which soon comes to an end, which amounts consequently to a teleological vacuum. Therefore, the supreme end of such beings is social rather than biological. The great man lives not for himself only, but for the great things he can accomplish for the elevation of mankind — the inventions he can devise, the systems of justice he can evolve and execute, the public policies he can inaugurate and administer, the conditions of health he can establish and maintain, the ideals of education he can conceive and realize; in short, he lives to serve his fellow-man by making him better able to serve himself, by promoting his individuality and his social well-being.

President Jordan speaks as follows concerning the pro-

posal to breed men as animals are bred: "It is evident that the human race is quite as plastic as the horse or sheep, and that if mating could be carried toward definite ends, even for a few generations, there might be startling results. It would be easy in a few generations under competent control to standardize strength, beauty, endurance, or virtue. But there seems to be no possibility that any group of scientific men could ever be called on to exercise such control. Moreover, those best worth while would never submit to it. The best of men and of women will always choose their mates for themselves. The artificial breeding of the superman, if such a thing can be conceived as a practical matter for the state to undertake, would defeat its own ends. It would breed out of existence the two most important factors the race has won, so far as mating is concerned. These are love and initiative. The superman produced by official eugenics would not take his fate into his own hands, and his descendants would not know the meaning of love." [1]

The Spartans once bred to produce the soldier, but they sacrificed freedom to maintain slavery; they laid down love and initiative to take up brute courage and endurance. They gave to the world only an example that the world refuses to follow.

[1] Jordan, D. S., "The Heredity of Richard Roe," pp. 153-154.

3. SELECTION AND EDUCATION OF THE SUPERNORMAL

Though the superman may not be of much use biologically, he is of great value socially. No race can afford to allow the development of its choicest minds to depend upon accident.

The old tutorial education had great advantages in the discovery and education of the supernormal among the classes who could afford tutors. When there is a teacher for one, two, or three children in a family, education can be individual in the scope of subject-matter as well as in method and rate of progress. N. Wiener[1] describes his own early education, in which his father was the tutor, somewhat as follows: "Father had two methods of procedure. He first opened up a new topic to me by conversation, showing its nature, purpose, and results. In this way he incited my curiosity and interest. Then when the study-hour arrived he set me a definite task of whose mastery he thought me capable, and forbade all recreation until it should be accomplished. Under the stimulus of this dual method I quickly ran through Latin, Greek, French, and German, and by the age of twelve I had mastered the mathematics taught in the high school. One day coming from Washington our train was delayed for several hours by a wreck ahead of us. By and by, Father remarked that this would be

[1] Consult article in *Pedagogical Seminary* for December, 1912, p. 463.

a good time to begin calculus. He then outlined its salient features, so that before the train went on I had a good general idea of the whole subject. My definite lessons in this branch began as soon as we reached home, and were continued rapidly until it was mastered."

It will be noted that in this system of tutorage the two ideas *interest* and *rigor* play an almost equal part. By the age of sixteen young Wiener had taken his A.B. degree at Harvard, done one year of graduate work there, and had entered Cornell as a second year graduate student in Philosophy. It is evident that no school system where large numbers are involved could have carried on this boy's education so rapidly or so effectively.

Next to the tutorial system, perhaps that of the Jesuits best succeeded in discovering and developing unusual talent, especially among the poor, from which class many members of the order were drawn.

American democracy in the development of its school system has never consciously discriminated against unusually gifted children, neither has it ever had them very much in mind. The system has been administered for the average, the feeble being carried as a load, and the able considered as a relief from mediocrity. Of recent years, however, a distinct recognition of the needs and rights of the subnormal has become somewhat general, so that in practically all large systems provision has been made for them in special classes. The question

is now being asked, "If we should make special provision for the education of the subnormal, why should we not also for the supernormal?" Several answers to this question are heard, such as, "Ability can take care of itself;" "It would be undemocratic, and develop a class of prigs;" "It would be a detriment to the mediocre to take from them the stimulating touch of superior minds;" "Precocity should not be encouraged;" and the like. But these answers do not seem convincing, since the rights of the superior child are certainly as 'sacred' as those of the inferior, and because social welfare is best promoted when the powers of each pupil are best developed.

There are already indications that our public schools have this problem in mind, since promotion is made more frequent and more elastic than hitherto, and since various schemes of individual instruction are here and there undertaken. There is small evidence, however, that our schoolmen have distinctly formulated the problem of the truly supernormal as have Stern,[1] Kerschensteiner, and other German writers. The latter think of the supernormal as composing one or two per cent of the school population, say twenty pupils of ten years of age per year in a great city like Berlin.

Eliminating the so-called infant prodigy or unusually

[1] Stern, "The Supernormal Child," Journal of Educational Psychology, Vol. II, March and April, 1911, pp. 143–148, 181–190.

precocious from consideration, Stern thinks we should provide special opportunities for the selection and training of highly gifted minds, under such conditions that diligence and rapid progress are demanded as conditions of continued membership in these classes. He recognizes both special and general ability. Thus some pupils may be able to do or learn one thing about as well as another; others are specially gifted in music, drawing, construction, mathematics, or language. Kerschensteiner tested some 50,000 of the children of Munich in drawing, and thereby discovered much talent, a part of which had not before been recognized. Similar tests might easily reveal other forms of special talent, which could then be provided for.

Under whatever name classes for supernormal minds may be conducted in the public school system, it is evident that such classes should be open to all who can qualify for them, and that hard work and high accomplishment should be made conditions of remaining in them. We shall need to devise a set of tests both psychological and educational for supernormal ability. These tests for the possibility of development will combine observation, experiment and analysis of objective results in drawing, music, plastic work, technical constructions, as well as in language, composition, mathematics, and science; they will take note of heredity, health, muscular coördination, and the like.

Again, shall the aim of supernormal education be to save time in passing over a fixed course, or to extend and intensify knowledge during the normal school period? It is easy to get the uncommon boy to perform the tasks of the common boy in much less time than the latter demands. A former principal of the Lawrenceville (N. J.) Academy declared that he could easily put his boys into college at fifteen, and so well prepared that they would be able to loaf half the time during the freshman year and yet meet all tests of scholarship. Principal Warren of the Albany (N. Y.) Academy declares likewise, that many of his boys are capable of passing the college examinations while still in knickerbockers. When boys of fifteen or under enter college, especially if they are below normal stature, they are often regarded as freaks, prodigies, 'infant wonders,' or even as 'mascots'; in any event they are not regarded as normal college men, and are more or less debarred from participation in college life. This, of course, is a misfortune.

By extending and intensifying the preparatory work, however, gifted boys may enter college with the physiological development of the normal freshman. There will then be no objection to their taking advanced standing, or omitting portions of mathematics, language, or science already mastered.

Finally, it may be said that biologically it is the golden

mean, the normal in humanity, rather than the supernormal that is desirable and attainable. Now and then the race will produce a man of rare and splendid quality; but he must not be treated as a demi-god whom no law can govern and from whom it is expected a new race of beings shall spring, for as he has small hope of posterity of his kind, so society can have no hope that his capricious power will promote its development. What society may expect, however, is that these superlatively gifted individuals will become its Washingtons, its Lincolns, its Grants and Lees, its Edisons and Eliots, who will clarify its ideals, direct its economic and educational forces, express its highest aspirations, and guide it safely through the perils that beset a developing civilization.

II. Euthenics

The measure of euthenics is the development of desirable inherent characters; its means is the improvement of the environment.

The Well-Being that comes of Good Environment

If eugenics would suppress bad blood, euthenics would suppress bad environment. If eugenics would select and cherish superior natural qualities, euthenics would bring to their highest possible development those good qualities that nature gives in varying degrees to all her children; if eugenics would eliminate the undesirable

individual, euthenics would eliminate the conditions that debase him.

Bad Conditions vs. *Bad Blood*

The world desires to be rid of paupers, criminals, idiots, the feeble-minded, and the kindred hordes that burden society. This class costs the state of New York alone some twenty-four million dollars annually. New York now has a law providing for the sterilization of hopelessly degenerate persons. The eugenist may conceive that if only all these undesirables were made incapable of reproduction the physical and mental regeneration of the world would be quickly accomplished. But reforms that seem easy are sure to prove hard. In this case, it is evident that unless the sources of misery are eliminated, new crops of degenerates are sure to spring up.

The philosophy of Darwin and Spencer has made us familiar with the idea of the *survival of the fittest,* which sometimes carries with it the assumption that the *fittest* are also the *best.* If that is fittest that best fits its environment, then many things that from one point of view are the fittest, are at the same time from another standpoint not the best, but the worst. The San José scale fits its environment very snugly, but in the estimation of the horticulturist it is a pest. The same may be said of bacilli that cause disease, like those that

underlie consumption, syphilis, diphtheria, smallpox, and yellow fever.

From a purely biological standpoint, those persons may be both fittest and best who can most successfully withstand the attacks of these destructive microbes. A black man is more immune to yellow fever than a white man, but in intellectual, moral, economic, and political aspects, the white is usually the superior. It is conceivable that a race of whites might be developed in the tropics who would be as immune to the yellow fever microbe as the blacks are, but the cost in good men would certainly be excessive. It is better, therefore, to kill the microbe or the mosquito that plagues, than to pay the price of immunity to his assaults. In the same way, it might be thought that we could in time develop a race so strong as to defy tuberculosis, yet the cost would be great, while unless the conditions that propagate the germ were removed, its devastating work would continue. It is better therefore to eradicate the germ and to combat the conditions in which it thrives, than to permit it to ravage mankind in the hope that in time men will obtain complete immunity through the elimination of the undesirable. It is eternally true that "the weed-killer is at the same time a weed-producer"; thus, alcohol ever produces new generations of drunkards, even though it tends to eliminate them; consumption makes more consumptives. It is better to kill the mosquito than to allow the

mosquito to kill the man, better to eradicate the hookworm than to allow the pest to paralyze the energies of a people; in short, better to remove a bad environment than to try to breed men capable of defying it. While eugenics is doing its best, therefore, to vitalize the blood of man, euthenics must make eternal warfare upon the forces in the environment that tend to debase it. "If the one would eradicate the drunkard, the other must eliminate the drink." Along with both must go a mitigation of the economic and other miseries that cause men to continue in pain what they began in pleasure. It is the business of euthenics, therefore, to make an environment in which the *best* may also be the *fittest*. Nature as such asks no moral questions, but society must both ask and answer them. She must produce an environment in which worth, intellectual and moral as well as physical, may prevail and survive. This means that diseases controllable by the public shall not be allowed to ravage mankind, that the conditions of healthful and happy living shall be open to every human being; that as men are protected from the pests that attack the body, so shall they be protected, as in some of our Western states, from the plagues that rob them of their subsistence.[1]

[1] Before the Kansas "Sky-blue" laws of 1909 were enacted, more than a thousand companies were selling in that state stocks and bonds, mostly of a fraudulent character. The money lost or stolen each year

The cogency of this argument is amply sustained by the investigations of social and economic reformers, as may be seen from the remarks that follow.

Devine[1] in his investigation of the causes of misery in New York City, comes to the conclusion that they are more economic and public than moral and private, while his study leads to the conclusion that least of all are they due to heredity, even though it be conceded that many in the slums come of poor stock.

Rowntree and Lasker[2] took a census of all unemployed persons in the City of York, England (82,000 inhabitants) on June 7, 1910. These they counted and classified as follows: youths under 19, 129; men who had been regularly employed and were then seeking such employment, 291; casual workers, 441; workers in the building trades, 173; work-shy, 105; women and girls, 139. They conclude as follows with respect to character and

by this means exceeded all the expenditures for public purposes. Now only representatives of approved stock and bond companies are allowed to do business in Kansas. The number of companies has dropped from one thousand to just forty-nine. Owners of bank stock are made responsible for bank solvency on pain of imprisonment, so that there are no more bank failures in that state. Corporations may no longer exploit the people with immunity, violaters of the excise laws can no longer escape with fines, but must go to prison if convicted. The result of thus making it easy for virtue and hard for wrong to survive is that wealth accumulates rapidly and well-being is well-nigh universal.

[1] Devine, E. T., "Misery and its Causes," The Macmillan Co.

[2] Rowntree and Lasker, "Unemployment: A Social Study," The Macmillan Co. For conclusions see ch. IX.

efficiency: "We have seen that in the two principal classes of unemployed workers, namely, those seeking regular work and the casual workers, numbering all together 732, or 57.3 per cent of the whole, about half were men of good character and physique, while the others were more or less handicapped by some physical, mental, or moral defect. Of the unemployed lads, four-fifths had a bad start in life, and the majority of them were certainly below the average in ability and character. In the building trades, on the other hand, the ability of the unemployed men was not markedly inferior, but we found that moral defects which did not actually lessen their value as workers were here less of a handicap than in the other trades. . . . But our figures show very clearly that it is quite a mistake to regard the problem of the unemployed as primarily one of the character and efficiency of the workers. On the contrary, improved morals and increased technical ability, important as they are, can never solve that problem unless they are associated with industrial and economic reforms." Among the remedies proposed are: Training for youths; Regulation of work of public bodies; Afforestation (planting of public forests); Decasualization of labor; Insurance; and Decentralization of town populations. These are all proposals for the improvement of workers. When one considers to what extent education may influence character and economic efficiency, one concludes

that the main reliance for progress is not so much improved heredity, however desirable that may be, as the improvement of that part of the environment which is under control.

Patten has no difficulty in showing that many of the characteristics that early fixed themselves upon the Christian religion were due to the progressive sterilization of Asia Minor through decreasing rainfall.[1] In his "New Basis of Civilization," he shows that material resources, heredity itself, family life, social classes and social consciousness, amusements, character, and social control are all transformed through the influences of an improving environment. Practically all recent economic literature tells the same story. We have a new agriculture in which men find a place for the use of their minds, and a new horticulture, both of which tend to increase indefinitely the food supply for man. We have a new biology which gives us also a new hygiene, a new world of technology which multiplies many-fold our power of production, at the same time equalizing and rationalizing our means for enjoyment. These things, and many others like them, are all due to improvements of a controllable environment.

Nature must indeed give us something to start with. All the laudable efforts in the world will not make an imbecile rational or a feeble-minded child strong-minded.

[1] Patten, S. N., "The Social Basis of Religion."

But nature does for the most part give us all we need to start on. Saleeby tells us, as we have already seen, that nine-tenths of the infants, even of the slums, are physically splendid little specimens of humanity.[1] Nature renews herself in every generation, thus purifying the fount of life, and making it possible for man to rise step by step to higher planes of living. Our main duty, therefore, is to control what lies solely in our hands, *doing what we can meantime to keep the sewers of humanity from emptying into its rivers*. The eugenist has indeed no difficulty in showing that heredity is decidedly potent in feeble-mindedness, in epilepsy, tuberculosis, insanity, and certainly to some extent in criminality, and his argument is sound when it maintains that parenthood should be regulated or else denied to those who are sure to beget miseries to their offspring, and new burdens to society; but repression is after all not the chief duty of society; it is rather the conservation and development of that uncontaminated infant humanity that renews itself in every generation. In new life there is always new hope.

[1] Saleeby, C. W., "Parenthood and Race Culture," see ch. II.

CHAPTER VI

A SOCIALIZED INDIVIDUAL IN AN INDIVIDUALIZED SOCIETY

The measure of a socialized individual is his social efficiency, both in promoting and in utilizing the social groups of which he is a member; the means for socializing an individual is training in social disposition and in the social applications of knowledge.

The measure of an individualized society or social group is the degree to which it fosters the complete development of the individual; the means for individualizing society or a social group is coöperative effort in securing for each member the full benefit of coöperation.

1. Fluctuating Views

All social organization begins and ends with the individual. Historically, the relation of an individual to any given social group is a fluctuating one. In a pain economy where there is a chronic condition of social deficit, the individual, especially among the lower classes, is more or less completely submerged in the social whole. His labor, his property, his personal service, even his life, belong to one or another of the social groups to which he belongs. He must work and

fight for his overlord, he must obey his priest, he must think as his superiors think, claiming only the pittance that will hold body and soul together. Another picture is presented by the four hundred years of social and economic development in America. Under pioneer conditions with an abundance of free land just beyond the settlement, with not only the possibility, but in many cases the necessity, of independence and self-reliance in thought and action as requisites for survival, even the completely socialized immigrant from Europe was compelled to be his own man. But now America is talking and acting social domination and individual subordination. Even so clear-headed a writer as Bosanquet [1] talks about the futility of a "self-absorbed personality." He holds that personal emotion, that most subjective aspect of individuality, is mean and insignificant if kept purely individual, but is maximized by being made social. It is acknowledged that the finite nature of the world compels us to have separate bodies and minds, but our 'foreignness' is not considered fundamentally important. It is a mere difference of organization of a content that is at bottom social, or common to mankind, so that individual distinctness, though having a physical basis of reality, is unimportant, since knowledge, thought, science, and, for

[1] See Bosanquet, B., "The Value and Destiny of the Individual," The Gifford Lectures for 1912, Lecture II. The Macmillan Co.

the most part, feeling, have the universality that comes of truth or of sentiment whose origin and development are social.

The reasons for this changing attitude away from the individuality of the pioneer to the sociality of the urban dweller lie close at hand. It is not social deficit that is now driving us together, but density of population, and the coöperative spirit necessitated by economic organization. Capital is concentrated and employed under the control of corporate bodies, often of gigantic dimensions. In this way the machinery for wholesale production and distribution can be utilized to the utmost. Labor, on the other hand, is similarly organized into bodies of even more universal scope. The old conception of government limited its function to police or military protection; but now government is expected to secure the conditions of health for all, to develop new sources of wealth, to conserve natural resources, and even to perform common economic services that it has not hitherto attempted. The term *Jeffersonian Democracy* implies the pioneer individuality of our early history, but now the term must be differently interpreted, if it is to have significance.

Every generation must, in short, reinterpret the term *individuality*. Each race, each nation, must periodically reconstruct its ideals of the relation of the individual to his social groups. The problem is eternal;

it is always in process of solution, yet never permanently solved.

The time may come when the completely socialized individual will be the highest ideal which education can entertain and try to utilize. But though it may be conceded that our notions of individuality generated by a rich, extensive, and sparsely peopled continent need revision, yet it may also be contended with some show of reason that conditions do not yet compel us to accept a view of life in which the individual does everything for others and nothing for himself.

A conception more in accord with the actual situation and with our inherited notions, is that as population and the means of production increase, the individual must more and more utilize social coöperation as the best means for personal advancement; for, after all, as our feelings, our thoughts, our motives, and our moral character, like the hand of Douglas,[1] must be our own, so our coöperative activities, however altruistic and social in form, must in the end have a personal reference and purpose, except perhaps as we simply squander what we have. This personal reference of social action is best seen in economic production and exchange. Each man

[1] "My castles are my king's alone
From turret to foundation stone;
The hand of Douglas is his own,
And never shall in friendly grasp
The hand of such as Marmion clasp." — SCOTT.

works for himself while producing for others. The farmer raises food for the public, but manufacturers produce clothing, tools, machines, household articles, and everything else enjoyed but not produced by the farmer, in return for what he furnishes to them. That money is the medium of exchange does not alter the fundamental relation. It is mere social sentimentality that pictures the producer of any article of utility or beauty as producing it from purely altruistic motives, as from charity. Self-help through coöperation is a nobler conception than that of mere benevolence.

It is indeed not difficult to get primitive reactions in the modern man, and as these reactions were once necessary to survival, and in consequence have become more or less reflex and instinctive, so they may still be expected, and they are indeed often an honor to manhood. Thus we shall still try to rescue the wounded, though we know it would have been better to prevent the battle; men will continue to perish in rescuing people entrapped in burning houses, even though it would be better if we had adequate fire escapes or fire-proof buildings. Men will still offer themselves as food for powder, even though politicians incite the wars in which they themselves refuse to participate. We shall long try to mitigate the sufferings caused by intemperance, though we will not lift a hand to prevent ruthless men and corporations from exploiting their fellows even to the extent of lessening or de-

stroying their economic efficiency and rendering their lives worthless. Jack London says that men will never to the end of time destroy the saloon, but that women will when they have the ballot. Self-effacing altruism may at times be a decoration of life, but it can never be its fundamental working principle.

There are three important educational aspects of these social relationships: —

(1) *Socializing the Individual*

By this is meant, not the extinction of individuality in socialism, but the training of the individual in social disposition and social efficiency. Working alone, he is a pigmy; working with others, he may be a giant, or at least help to get a giant's work done.

Irving King has brought together in his "Social Aspects of Education" the social views and arguments of many of our best and most progressive writers in this and other countries, such as Dewey, Kerschensteiner, Ward, Cooley, Ray, Royce, Burnham, Mead, Scott, Reeder, and many others.[1] Among the topics discussed are the following: The social responsibility of the country school; the school as a centre of social life; playground extension as an element in the socializing of education; the social effects of the school garden, where children work together

[1] King, I., "Social Aspects of Education," The Macmillan Co., New York.

for common ends; the social significance of vocational education, which fits a child for coöperative capacity in the economic world; the opportunity that the school may give in the development of social impulses and instincts that have arisen from ages of human experience; the expression of these impulses in self-government in school, the social atmosphere of the schoolroom in the pursuit of knowledge and in the formation of character.

The result may be summarized in the following creed: *I believe that my own greatest good is to be won through coöperation with others for those things that we all desire; therefore, whether I work or whether I play, I will join my efforts with theirs in groups that shall be small or large, transient or permanent, as convenience or custom or the accidents of the situation may determine; I will work for the public good in small things as in great, and to my fellow-men who contribute to my good I will be true and loyal even unto death.*

Hence the social group finds its genesis and continued existence in the common efforts of socialized individuals.

(2) *Individualizing the Social Groups*

No social group is an end in itself to the extent that it may be allowed to forget or ignore the proportionate good of each of its members. My moral allegiance to

any group, political, religious, or economic, is cancelled, whenever it shall demand my allegiance, yet deny my claim to the common benefit that should arise from it; when, in short, it demands something for nothing. Men are prone to exploit their fellows by forming them into groups and then appropriating to themselves all the benefits of the organization. Thus, a coöperative company for gain may be so formed and so manipulated that the benefits of the common contributions may be appropriated by a few. City bosses may, in the name of democracy, form an oligarchy in which the benefits that should accrue to all are corruptly seized by themselves.

The principle of advantage according to contribution must of course be recognized. The man who has one share in an enterprise properly expects only one-tenth the gain of the man who has contributed ten shares, but, because the latter owns ten shares, he is not justified in absorbing the gains that should accrue to nine other men holding one share each, even though ten shares can outvote nine. An organized group must have officers to conduct it. These men contribute a service which is paid for, sometimes in money, but often in honor. Members of school boards usually serve gratuitously, but officers of financial corporations, or of groups demanding much time, labor, or financial responsibility, usually receive salaries for their services. This

is right and proper, as every one knows, but it is easy for such leaders to assume that the organization exists for their sole benefit, and, taking advantage of the indifference, neglect, or helplessness of the other members, absorb not only what is justly due them, but everything in sight. Few small investors have escaped joining enterprises either fraudulent in inception or in the conduct of the business. The example of Kansas and her laws against the selling of insecure bonds and stocks, cited above, is a case in point.

The young, therefore, need to hold others and themselves to strict justice and accountability in the conduct of group enterprises both in and out of school — in their games, their athletic and literary societies, and in all other group enterprises, transient or relatively permanent, in which they may engage. The same principles should be observed and discussed in civics and history or in the study of any other phase of human institutions of past or contemporary interest. They should perceive that the stability of Anglo-Saxon government in general depends upon the recognition of the fact that benefit depends upon contribution, that privilege arises from responsibilities that are met, that rights arise from duties performed.

Hence the social group finds its end, not in itself or its officers, but in the benefits it contributes to each of its members.

(3) *Group against Group*

In this country the question as to how completely the individual shall be socialized is largely academic, since it has little or no effect in deciding practical affairs; but society is ready to punish by fine or imprisonment the dishonest leaders of organizations who appropriate to themselves the gains that really belong to the members. The burning questions of politics and economics, however, pertain to the collisions that arise when group meets group in a struggle for supremacy. It is natural that a corporation organized for gain should seek to avoid competition so far as possible, as through the possession of patents or secret processes, or by their superior manufacturing or selling ability, by the prevention of waste of material or labor, by the installation of the most modern machinery, or by superior initiative, insight, or foresight; but when it seeks to remove competition by violently destroying it through power immorally, even if not illegally, employed, then mankind has a right to protest. The claim that it is doing this for the benefit of the members of the corporation is not valid, for the corporation itself is engaged in an unjust exploitation of the other competing groups, and it may be of the public as a whole. Many are the ways in which business groups conspire to undermine the competition of rival groups or exploit the general public. Pro-

ducers of implements and munitions of war often seek to embroil friendly nations, or to raise fictitious alarms, or to arouse race antagonisms, in order to increase the sale of their goods; manufacturers at times predict, or even produce, economic depressions in order to make it appear that their own special privileges are necessary for the public good.

The discussion of these themes brings us to a recognition that the new economic order differs from the old, and that in consequence a new type of problem arises, a problem which cannot be solved by the application of the moral maxims of the old order. These changes are in brief as follows: 1. A shifting from an individual to a collective basis in production and distribution. 2. A corresponding shifting from personal to corporate relations. Men now work more exclusively in groups, and, because they do, we are forced to consider the action of group against group, rather than the relation of a given individual to a given group.[1]

We have first of all the permanent conflict between the great group of producers and that of the consumers, in which each individual as a producer has relations to a relatively small group (his own business, trade, or profession) and, as a consumer, to a much larger group or series of groups (those who consume the same things he

[1] See Dewey and Tufts, "Ethics," pp. 486–522, Henry Holt and Co., New York.

does). May a firm, trust, or corporation drive its competitors out of business by lowering the price to a point that will produce their bankruptcy? Or shall it raise the price to all consumers in order that its rivals may remain in business.

Again, a labor union has a double set of conflicts, first, against employers, and, second, against the great class of non-union laborers. As unions, they tend to check production by raising wages and by shortening the number of hours of employment. These actions also increase the price of the articles produced, as may be plainly seen in the building trades in any community. A new question arises when we consider whether the unions shall be open to all, or to a selected class only, or whether the number of apprentices shall be limited. Again, may unions combine with capital to raise prices?

When it comes to the solving of these and similar problems, we are confronted by this difficulty: Men at first attempt to settle new questions by the rules of the old order. Human conservatism, as well as vested interests, makes legislation and the public sense of equity lag behind the progress of events and the changes of conditions. Most lawyers and perhaps most men still discuss labor unionism as an intruder into the old and presumably true order of individualism that existed before the industrial revolution. The lawyers think of

the old laws, the others of the old moral system. The old virtues related to the actions of individuals as such; the new virtues arise from actions in concert.

Machinery and modern technique have enormously increased production, but they have also increased danger to life and health, and they have tended to relieve individuals from the responsibility for these and other evils. If the trade or the business or the factory devours men and beggars families, who shall be blamed? Since the old order no longer applies, and the new is not yet in effective operation, men are disposed to ascribe the evils to accident, necessity, or providence, and to let it go at that.

How shall products jointly produced be distributed? Men put in labor, skill, capital. Some of these elements are inherited from kin; some come from inventors and men of science who devised processes and machines; some are wrought out by the individuals themselves, either through native endowment or the training of the schools. This pooling of contributions is profitable, but how shall the profit be distributed? Shall there be rules? How devised?

New aspects of the same problems arise when we consider the wages of women and children. For if one employer pays them less than enough for a decent moral life, what about his competitor across the street who tries to do the fair thing? If one manufacturer is allowed

to practice "sweating," all who do not practice it are placed at a disadvantage. If one group evades taxes, the groups that are forced to pay them cannot compete on even terms. If one corporation secures special legislation, similar corporations without such advantages will suffer. If a corruptly obtained contract or franchise is enjoyed by one firm, all competing firms are so much the poorer. If one merchant permits himself or is permitted to adulterate his goods, not only does the consumer lose, but competing firms likewise.

So long as individuals may hide behind corporations, but little can be done to amend or remove these deplorable conditions; but as soon as responsibility is placed firmly upon the officers of an offending group, beginning at the top, and punishment for illegal, corrupt, or unfair methods is visited upon them personally, then the way is open to immediate and permanent reform. Society as a whole must through legislation fix responsibility and prescribe punishment, but the school can do much by inculcating principles of moral conduct in accordance with new conditions.[1]

[1] See Vol. III of this series, "Ethical Training," for details.

PART II

THE STUDIES OF THE SECONDARY SCHOOL

CHAPTER I

BASES FOR SELECTION

1. How Selected in the Past

The history of education shows that the secondary curricula of the past have been chosen chiefly with respect to three things, namely: (1) The status of the persons to be educated; (2) the ruling ideals of the time, nation or curriculum maker; (3) the range of suitable knowledge available. Applying these categories with respect to the Spartans; the Athenians; the Romans, as, for instance, in the time of Quintilian; the Italians in the early renaissance; the Germans in the time of Sturm; the English in their so-called public school system of secondary education for the sons of nobles and gentry since 1688; one can understand why they did what they did. In similar fashion one may apply these tests to the many reform systems that have been proposed. Thus, with Plato in his "Republic" the ruling ideal is, *Up to philosophy!* The persons to be educated are those who remain after a long series of siftings; the material available for this stage and fundamental to philosophy consists of music, literature, grammar, rhetoric, and geometry. With Rousseau in his "Émile" the ruling ideal is, *Back to nature!*

Here the persons to be educated are the children of those who have been corrupted by society, *i.e.*, the upper classes, and the material consists of suitable selections from the arts and sciences that neither corrupt nor have been corrupted. With Spencer in his "Education" the ruling ideal is, *On to science!* Secondary education with him applies to all who have capacity, means, and ambition to avail themselves of its advantages. The material available and most suitable because most conducive to complete living is science; first natural, and then historical and social.

Discussion: — Application of the foregoing tests in detail to the cases suggested.

The three factors, social status, ideals, and materials, will doubtless determine the curricula of the future as they have those of the past, while their great variability will continue to give rise to differences of opinion as to the relative weight that should be given to this or that element of the problem. Even among the Athenians there was not unanimity of opinion concerning the ends and means of education, for Aristotle in his "Politics" remarks, "In our times men contend about the purposes of youthful training; they are not united as to what our youth should learn, whether that which enables them to attain virtue or happiness in life; nor is it decided whether one should work more for the

development of the intelligence or of character; the education of the day leaves the question in doubt and makes no decision as to whether one should favor what pertains to the demands of life or to the attainment of virtue or should favor studies even that extend beyond these ends. Each of these views has found advocates." [1]

The past is fairly united, as is the present, in the proposition that secondary education should be more general than special, that it should serve as the prolegomena for future study, laying a sure foundation of knowledge and skill for subsequent specialization. But no lesson is more certainly taught by the history of the educational past than the futility of trying to establish a single curriculum that shall be valid for all men at all times; for even when one of the three factors, as that of ideals, is subject to variation, there must arise the state of opinion described by Aristotle. When, however, ideals vary, and the classes of persons to be educated include every station in life, and the suitable material available for study is indefinitely multiplied, this futility appears with threefold force.

DISCUSSION:—Compare the fixed curriculum of the English "public school," as at Rugby, with the elastic curriculum of the American city high school, showing how the three leading factors vary in the two cases.

[1] Aristotle, "Politics," VIII.

2. The Argument for Concentration in the Narrow Fixed Curriculum

Wherever in the past the leading aim of education has been clearly defined and so important as to overshadow all subsidiary aims, and when, moreover, a few studies have greatly outranked all others in their contribution to this aim, we find the fixed curriculum, which lasts until fundamental aims or conditions change. Examples are found in the Spartan education; in that of Athens before the rise of philosophy; in scholastic education; among the Jesuits, whose curriculum remained essentially unaltered for two hundred years; in the English public schools from the coming of William of Orange until the days of Thomas Arnold; also in many stages of humanism in other times and countries. As soon, however, as ideals or conditions so change that the validity of the established curriculum is disputed, the advocates of the old are thrown on the defensive. For they are called upon to defend the system under which they have grown up and of whose beneficent effect they are absolutely certain.

The argument then runs as follows: This system has been tried and not found wanting; it was good enough for our fathers, and will prove equally valuable for our children. The proposed new system is revolutionary and will destroy our most cherished institutions, our

educational heritage.[1] When impelled to give more definite reasons why newer studies should not partially or wholly displace the old, the advocates of the established curriculum invariably urge the superiority of the old studies for the training of the mind. "Behold the giant intellects of the past!" they exclaim. "This is the meat upon which they fed. Their faculties were thereby adequately developed. Faithful and efficient in these few things, they were made rulers over many things. Minds made strong by these studies, like muscles strengthened by a few exercises, are capable of doing any work that may be demanded of them; intellects thus made keen, like the well-sharpened knife, can cut anything; power thus generated can be applied in any department of life, as the electricity concentred in a storage battery can be made to yield motion, heat, or light." Curiously enough, the advocates of new studies are at first disposed to admit the validity of the argument for formal intellectual training, but to urge that what they propose will do the same thing, besides having the advantage of being better adapted to modern needs. This has been one of the grounds upon which the introduction of electives into the course of study has been defended.[2]

[1] See complaint of Aristophanes over the new education in Athens after the rise of Philosophy; Davidson, "Education of the Greek People," pp. 92–95.

[2] See "Report of the Committee of Ten," pp. 52–53, 56–59.

Thorndike quotes extensively from influential writers on psychology and on education to show the wide prevalence of the idea of formal discipline as a settled educational doctrine.[1]

It is only in recent years that the doctrine of the formal discipline of the mind has been seriously examined and its validity qualified or even denied. The first in Europe to do this were the followers of Herbart, on the ground that since all mental exercise takes its rise in a definite mental content, its character is necessarily determined by its origin, so that it would be absurd to assume that thinking power developed by the study of mathematics, for instance, would as such have any validity in that, say, of biology. Biological thinking to have any worth must spring from a biological content.[2] The first study of the problem in the United States was made by the late B. A. Hinsdale, of Michigan University, in a paper read before the National Council of the National Educational Association at Asbury Park, N.J., 1894.[3] After careful analysis of the doctrine as applied to sense apprehension, memory, imagination, logical thought, and volition, with abundant use of literary and historical

[1] "Educational Psychology," pp. 82–84.

[2] See article, "Formale Bildung," in Rein's "Cyclopädie der Pädagogik."

[3] B. A. Hinsdale, "The Dogma of Formal Discipline," N. E. A. Report for 1894; also in *Educational Review* for September, 1894; also in Hinsdale, "Studies in Education."

citations, the writer comes to the conclusion that mental power developed in any one field of thought cleaves to that content so far as its chief field of exercise is concerned, but that there is some overflow into congruent channels, just as exercise of the muscles of any part of the body, say of the right arm, probably strengthens somewhat the whole muscular system. All mental power is therefore more special than general, for it becomes general only in so far as other fields of thought are congruent, or related, to those out of which the power was developed. Hinsdale's conclusions, derived from analysis and experience, coincide substantially with those deduced by the Herbartians from psychological premises. More recently the doctrine has been subjected to practical experiment, in order to show how far the training of any mental function improves other mental functions. These experiments and investigations of a considerable number of psychologists are adequately described by Thorndike, and confirm the conclusions of Hinsdale and the German Herbartian writers.[1]

O'Shea has treated this topic at length in his "Education as Adjustment,"[2] as has Bagley in his volume entitled "The Educative Process."[3] Both agree with the earlier criticisms of the doctrine. O'Shea ascribes the

[1] E. L. Thorndike, "Educational Psychology," pp. 80–93.

[2] Chapters XIII and XIV.

[3] Chapter XIII.

"spread" of special training to the fact that many lines of activity differing in several characteristics may yet have some characteristics in common; while Bagley proves by argument and experiment and appeal to experience that there is no such thing as a generalized habit; that all habits are specific. He asserts, however, that we can develop through specific exercise in a single department of thought both in ourselves and in our students *ideals* of industry, neatness, accuracy, cogency, and the like, which may easily extend to other departments of thought, thus furnishing to this extent a formal training.

The position of the present writer is that most if not all the effects hitherto ascribed to formal discipline are better explained by a careful analysis of relative educational values as based upon the content of the studies themselves.

Discussion: — Debatable points in the doctrine of formal discipline.

3. Reliable Tests of Educational Values

If the doctrine of formal discipline is inadequate to explain the unquestioned educational results that spring from a seemingly narrow curriculum, like that of language and mathematics, to what then shall we ascribe these results? How, in other words, shall we test the educational worth of any given body of subject-matter? The answer to this question is already implied in the rejection

of the doctrine of formal discipline, for if the fact be established that all training cleaves to the content in which it originates, it follows immediately that in an analysis of content we shall find the worth of a subject, not only for practical life, but also for mental training. The doctrine of formal discipline must give way, therefore, to the doctrine of concrete specific discipline. If, then, we grant the superior character of the training in language and mathematics, we shall be obliged to assume a depth, breadth, and universality of content for these subjects such as the classicists themselves in their zeal for an easy but unsound explanation have not always claimed. That these subjects have this universality and richness of content subsequent sections will attempt to show.

Subsidiary claims to superiority based on temporary conditions, such as the ease with which a subject can be taught, or the superior quality of teaching that may at any time be manifest, have no lasting validity, for if a subject is hard to teach so as to secure good educational results, all we have to do is to learn to teach it properly. Natural science in the universities offers a brilliant illustration of how a subject can produce its legitimate mental and practical results when the spirit and technique of its teaching are developed and generally applied. So long as science was taught according to literary methods its educational inferiority was manifest; but when men discovered methods in harmony with its content and aims,

then it took full rank alongside the older disciplines. Teachers are still striving to perfect their methods of teaching other new subjects, such as history, modern foreign languages and the mother tongue. The success that science has attained in the last forty years points to the possibility of an equal success in the new fields.

DISCUSSION: — Comparative validity of the doctrine of *specific* as opposed to *formal* discipline.

An unqualified answer to the question, "What knowledge is of most worth?" can hardly furnish a satisfactory course of study; for we must at once ask, to whom? for what purpose? under what conditions? Herbert Spencer, shortly after the middle of the nineteenth century, asked the question in his well-known book, "Education," and gave the unqualified answer, "Science is of most worth." However great the influence of this book may have been, nobody has ever been able to construct a successful course of study in accordance with the answer given. As a special plea for a department of knowledge then coming into a highly developed state, but largely neglected by the school, Spencer's contribution was most important, even epoch-making; but as an all-round guide to the selection of subject-matter for schools it could not in the nature of the case be satisfactory; for, on the one side it neglected or undervalued the institutional side of modern life,

while on the other it failed to distinguish sufficiently between the individual and the professional need of science. We need, for instance, good sanitation in our houses, but all men need not be plumbers; we need clean antiseptic treatment of wounds, but all men need not be surgeons; there is likewise professional and popular need of chemistry, physics, biology, astronomy, etc. Much of Herbert Spencer's plea for science pertains only to professional needs, and has, therefore, small application to the high-school curriculum.

Discussion: — Grounds for Spencer's criticism that literary education is merely for adornment.

As in the past, so in the present, not a little confusion in the selection of studies arises from the attempt to compass in a single aim all the purposes of education. Modern education at least has aims, not aim. Even such elevated words as *character*, *virtue*, *highest good*, *citizenship*, *holiness* are at present inadequate guides for the making of the curriculum, for, on the one hand, they relegate to purely subsidiary rank many subjects of practical and educational value whose functions cannot be properly performed by more favored studies; and, on the other, they ignore or undervalue personal capacities and needs. The man who says *culture* is the end of secondary education will overvalue literary insight and undervalue practical efficiency; he who puts most

stress on intellectual acumen will have small patience with æsthetics; the advocate of specific utility will think more of special than of general education; the Herbartian who lays all stress upon "the development of moral character" transforms such subjects as mathematics, science, and accessories like physical and manual training into mere tails to the literary and biblical kite. It is the fate of all one-sided conceptions of the purposes of education, first to reject all aims not immediately pertaining to the final one, and then either to have a narrow fixed curriculum, or to admit into the curriculum subjects for whose presence the single aim gives no just warrant. Witness a judgment arising from the ethical aim of the middle ages: "Many learn for the sake of knowing, that is pitiful curiosity; others learn that they may be known, these are subject to the jibe of the satirist — your knowing is naught when no one else knows that you know it — that is idle vanity; others learn to earn money and station, that is contemptible commercialism; one learns in order to edify, and another to be edified, that is wisdom. Only the last two make no misuse of knowledge, for they seek learning in order to act rightly." [1]

DISCUSSION: — Modern attempts to formulate a single aim for education: "Complete living," "Character," etc. See Bagley, "The Educative Process," pp. 40–65.

[1] Willmann, "Didaktik," Vol. I, p. 286.

Gathering up the conclusions that follow from the foregoing facts and arguments, we find that reliable tests of educational values must consider the following presuppositions: —

(1) *A Hierarchy of Aims*

Study of the physical, mental, and social evolution of men shows that what we are disposed to regard as the lower aims of life are not mean, but only elementary. They have had and still have their part to play in the struggle for existence, and are only to be regarded as primitive because it is now so easy to supply these first requisites for survival. Let the water or food supply begin to fail in a community, or the fuel give out in winter, or the means of shelter be destroyed in a night, and we shall see how imperative these so-called "mean" motives of life will immediately become. Professor James [1] has described the hierarchy of *mes* belonging to every human being, in each of which he must dwell and if possible develop. There is the physical *me*, with its hereditary tendencies and results, which lies at the basis of my success and well-being in life, and out of which I must make as much as possible. Then there is the economic *me*, the intellectual *me*, the social *me*, the spiritual *me*, each of which is subject to atrophy, or degeneration, on the one hand, but on the other, easily capable of normal growth and

[1] William James, "Psychology," Vol. I, pp. 291–296.

refinement. The subject-matter of a well-selected curriculum will stimulate each of these potentialities of youth and provide nourishment for its healthy development. The maker of the course of study will not only recognize the presence of all these phases of existence, but will also provide for their simultaneous and adequate unfolding.

(2) *A Richness and Abundance of Material*

In the past, singleness of aim has been accompanied by relative poverty of material. The early Greeks had only their native literature, to which were added later geometry and philosophy. The schoolmen had for their advanced schools only the philosophy of the Greeks, and then confined themselves mostly to the dialectics. The early humanists wanted nothing more than the classic literature of Rome, to which that of Greece was afterward added. Indeed one may say that until the nineteenth century, there was but little valuable material available outside of philosophy, classic literature, and elementary mathematics. But, as if answering to the modern need for educational development in every aspect of life, we find a corresponding richness of subject-matter. Even the old disciplines have been perfected and extended as instruments of education, while a host of new subjects present themselves. One has but to think of modern philology and mathematics, of history, economics, and modern foreign languages, and above all of modern

natural science, to see how enormously the old curriculum has been extended and enriched. The formalist might regard this expansion of knowledge as of no educational significance, since his doctrine of formal discipline makes abundance and variety of material superfluous; but when in accordance with modern experiment and psychological analysis we accept the doctrine of specific discipline, then we see the necessity of a content as rich and varied as are the needs of men in modern life.

(3) *The Claim of all Classes of Society to Participation in Secondary Education*

Had not modern studies brought about a recognition of the hierarchy of *mes*, and with this the hierarchy of *aims* in education, and had not development of knowledge arisen from its internal forces, the coming of democracy even would have made both necessary. As the historian well knows, past singleness of aim and poverty of material have always been accompanied by narrowness of range in the social standing of those to be educated, whether it be the landed aristocrat or noble, the priest, the dialectician, or the classical scholar. Modern democracy, however, is satisfied with nothing less than the opportunity for universal education, not only in the primary school, but also in the high school and university. Whoever, therefore, seeks to confine education to a single aim, or a single class of society, or to a narrow curriculum

adapted perhaps to such aim and class, can hardly be a successful architect for the high school of modern democracy. But this extension of the benefits of education to all classes of the community brings with it the need of placing emphasis upon new aspects of capacity, interest, and destiny in the individual, and consequently the need of greatly extending and enriching subject-matter.

(4) *The Limited Amount of Time and Strength of the Student*

In European countries, especially in Germany, the desire to make secondary education not only thorough but broad has led to excessive demands upon physical and intellectual strength. The number of gymnasial students with defective eyesight,[1] for example, is well-nigh appalling, to say nothing of other impairments of body and mind. It is necessary, therefore, for the modern schoolman to devise means whereby we may duly recognize the limits of time and strength, while providing for the legitimate demands of a democratic system in the midst of superabundant material.

The following chapters will endeavor (*a*) to group the various branches of study into departments according to the nature of the content; (*b*) to inquire particularly as to the specific educational functions of each department, as indicated by the nature of the content itself; and

[1] See H. Cohn, "Hygiene of the Eye," Ch. VIII, pp. 63–69; also p. 77.

(*c*) to forecast the principles according to which a curriculum for a given purpose can be constructed.

DISCUSSION: — 1. Effects of modern evolutionary theory in determining the aims of education. 2. Twofold influence of democracy and the development of systems of knowledge in bringing about variety in schools and discipline.

CHAPTER II

THE CLASSIFICATION OF STUDIES INTO SIGNIFICANT GROUPS

Attempts have been made by such men as Comte, Spencer, and Bain to arrange departments of knowledge into a hierarchy of subjects beginning with the most elementary and closing with the most comprehensive. Thus Comte places biology at the bottom and sociology at the top. Yet so numerous and intricate are the interrelations of the sciences, both natural and human, that each thinker finds it easy to criticise the arrangement of his predecessor, but hard to propose one not subject to like criticism. Life, for example, which is studied in biology, presupposes physical and chemical forces and an abiding place in which to develop. If, therefore, we follow the course of evolution, why should not the antecedent conditions be placed first? If in our search for that which is most fundamental we go back to final causes, we shall become involved in the intricacies of speculation, and perhaps decide with Anaxagoras [1] that in the beginning there were two factors, a chaos of matter interpenetrated with *nous*, or forming mind, when we may take our

[1] See any history of Greek Philosophy.

choice as to which to place first, the awaiting material or the forming force. Neither could effect anything without the other.

Arrangement of the branches of knowledge in a hierarchy being impracticable, we are at liberty to arrange them according to convenience of treatment. One might follow the order of their importance in education, but here differences of opinion would arise. Of one thing we may be fairly sure; namely, that knowledge has been gradually differentiated and broken up into specific subjects from convenience in treatment, and we are at liberty to assume that each subject, as geometry, physics, physiology, history, etc., embodies a specific content that differs so essentially from that of every other subject that no two can be so successfully studied or developed together as they can be apart. It would appear, therefore, that since content is not only the source of educational value, but is also the ground of any natural and convenient classification, we may accept the subjects of study as we find them, and proceed to group them in any way not inconsistent with their fundamental nature.

Discussion: — Historical attempts at a logical classification of knowledge. See Bain, "Logic: Deduction," pp. 229–236.

The broadest and most obvious distinction in the content of subject-matter of knowledge is that between (1) the facts and laws of physical nature, which, though

observed and formulated by the mind, are not dependent upon the mind for their existence or validity, and (2) the linguistic, literary, artistic, and institutional constructions that have their genesis in the thoughts, feelings, and volitions of human kind. The first group pertains to nature, the second to man; the first might be called the sciences (including of course mathematics), the second the humanities. Both have from the earliest times been in varying degrees the subject-matter of education.

So intimate and so important, however, have the interactions between the purely natural and the purely human become that a convenient threefold grouping may be proposed, as follows: —

1. Natural Sciences (including mathematics), or those that pertain solely to nature.
2. Humanities, or those that pertain primarily to things purely human, such as language, æsthetics, politics, ethics, religion, etc.
3. Economic Sciences, or those in which the laws of nature are applied by human volition to produce the conditions for the well-being of individuals, the multiplication of populations, and the further development both of natural sciences and all that pertains to man as such. To this group we may assign not only economics proper, but many technical branches arising from applied science.

1. The Natural Sciences

The physical world may be regarded (1) as relatively stable, yet under the constant influence, outwardly of mechanical, and inwardly of chemical, forces. Mechanical forces hold the whirling worlds in their grasp, effect the movement of winds and waters, the falling of bodies, the phenomena of light, heat, and electricity. Chemical forces are those that effect changes or secure equilibrium among the minute molecules that make up the composition of bodies. The physical world may, on the other hand, be regarded (2) as in a state of growth, development, or evolution. Everything, even the sun, the stars, the planets, the nebulæ in the heavens, the world itself and all the plants and animals upon it, are now conceived as being still in a state of evolution, or at least as having reached their present stage through long ages of development.

It has long been the custom to group together those sciences in which mechanical and chemical forces are predominant as the *exact sciences*, since the laws that govern the domain of mechanics and chemics are in general capable of such demonstration as to leave no doubt concerning their truth and universal validity. Many of these laws involve quantitative measurements, and as such are seen to be mathematical. Mathematics is therefore rightly classed with this group; for however independently and abstractly its truths may be investigated, yet they

always find their application in the quantitative aspects of the physical world.

A second group of natural sciences arises from the genetic aspect of the world; namely, those that pertain to life, or living things like plants and animals. These are the biological sciences, zoölogy, botany, physiology, embryology, etc.

A third group, consisting of what are called the *earth sciences* (physical geography, geology, etc.), arises from the mixed and complicated nature of its elements, for the earth has been and still is subject to mechanical evolutionary forces; it shows the results of past and present evolution in the nature of life; while many of its most striking phenomena (earthquakes, volcanoes, hot springs, etc.), are due to mechanical and chemical forces. According to this analysis the natural sciences of interest to the high school may be conveniently grouped as follows:

Group I. The exact sciences: mathematics, physics, chemistry, astronomy.

Group II. The biological sciences: zoölogy, botany, physiology (embryology, bacteriology, etc.).

Group III. The earth sciences: physical geography, geology.

2. The Humanities

The sciences which owe their genesis and development to the mental and spiritual needs of individuals and

societies are numerous and important. Among them we find first of all, language, with its manifold departments; then history and art; then jurisprudence, political science, theology, psychology, logic, philosophy, sociology. All of these, though having more or less intimate relations to the material world, as everything mundane must have, are yet primarily the outgrowths of the psychic and social nature of men. Throughout the whole history of civilization they have furnished the chief materials of culture; it is upon their substance that the minds of men have been nourished; out of their treasures of knowledge the curriculums of the past have been constructed; in them the educational interests and hopes of mankind have centred.

In language we have to distinguish between the content itself, as embodied in literature, and the technique of speech, as seen in grammar, rhetoric, etc. The moment we begin to analyze the content of literature, however, we perceive that the æsthetic and the ethical are so deeply embedded in it and so inextricably interlaced that it is impracticable to try to separate them for purposes of curriculum making. Like the two blades of the shears, they may be distinguished, but should not be sundered. In like manner, it is only for purposes of estimating educational worth and determining relative emphasis in instruction that we may be permitted to separate the technique of speech, *i.e.*, the grammar, rhetoric, etc.,

from its substance, *i.e.*, the literature. Logically they may be separated, but didactically they belong together.

Excluding those sciences whose province lies beyond the high-school period, we find history and the fine arts as the remaining subjects of this grand department of knowledge.

The natural sciences have fallen into three convenient groups. Continuing the enumeration of groups by taking up the humanities, we have the following result: —

Group IV. Languages.
1. Literature (content, æsthetic and ethical) of ancient and modern languages, including the mother tongue.
2. Linguistics, including grammar and rhetoric.

Group V. Pure Æsthetics (the remaining fine arts), music, drawing, painting, sculpture, architecture, etc.

Group VI. History, including civics.

3. Economic Science

The scientific study of economics as an application of other sciences both natural and human began with the appearance of Adam Smith's "Wealth of Nations" in 1781. This new department of knowledge, practically only a hundred and twenty-five years old, has won for

itself an enviable position in the universities of Europe and America as an essential part of a rational curriculum of study. It has, moreover, so many aspects applicable to secondary education that its classification in a separate group is advisable for purposes of clear analysis, even if it should not be thought to arise from logical necessity.

In many high schools it is customary to enumerate elementary economics among the subjects of study, and thus to make it a component part of the curriculum. In other secondary schools economics furnishes rather a point of view for history, geography, and technical aspects of manual and commercial training. It becomes, therefore, not so much an applied science as a practical study arising from the blending of the science of man with that of nature. This gives us our third grand division and our final group: —

Group VII. Economics, including also commercial geography, and the technical aspects of commercial and manual training.

Gathering the results of our classification together, we have the following schematic arrangement: —

A. Natural Sciences

Group I. The exact sciences, mathematics, physics, chemistry, astronomy.

Group II. The biological sciences, physiology, zoölogy, botany (bacteriology, embryology, etc.).

Group III. The earth sciences, physical and mathematical geography, geology.

B. Humanities — The Sciences of Man

Group IV. Language.

1. Literature (æsthetical and ethical content) of ancient and modern languages, including the mother tongue.
2. Linguistics, grammar, rhetoric.

Group V. Pure Æsthetics (the remaining fine arts), music, drawing, painting, moulding, designing, etc.

Group VI. History, ancient, mediæval, and modern.

C. Economic Science

Group VII. Economics (union of science of man with that of nature), economics proper, commercial geography, technical aspects of commercial and manual training.

Discussion: — 1. Validity of the foregoing bases of educational classification of subject-matter; 2. other classifications that have been made; 3. that might be made.

CHAPTER III

FUNCTION AND RELATIVE EDUCATIONAL WORTH OF THE STUDIES AND STUDY GROUPS

1. Fundamental Distinctions between the Natural Sciences and the Humanities

Before entering upon a detailed analysis of the content and worth of the respective studies the student will do well to keep in mind the broad, fundamental educational distinctions between these two grand divisions of knowledge, for only by so doing can he avoid the confusion incident to the treatment of details so numerous and interrelated. These distinctions fall naturally into three groups; namely, those that relate (1) to truth, (2) to beauty, (3) to goodness.

In examining the character of the verities (that is, the facts, conceptions, and laws) contained in the two grand divisions, the first obvious difference that comes to view is that between causes and effects which are uninfluenced by human attributes as in physics, chemistry, and biology, and those, on the other hand, in which subjective or psychological forces have had a part, as in language, history, and fine arts. The human is variable; natural law invariable. Whether we study the mechanical

or the biological causes and effects of natural science, we concern ourselves only with efficient and unvarying causes, and the effects that necessarily follow from them without exception. Significant facts may be hard to separate and determine, conceptions may take centuries to form, and the knowledge of laws may be greatly delayed (witness the efforts of scientists to discover the causes of dew), but once the facts have been clearly learned, the conceptions adequately formed and the laws demonstrated, then are there no exceptions, there is no room for uncertain intuitive apprehension. Natural laws must be accepted as valid and invariable, whether in the realm of mechanics or in that of physical life. Furthermore the laws of the physical world rise to the highest generalizations, like those that pertain to gravitation, the indestructibility of matter, the persistence and transmutability of force, and the correlation of forces.

The result of so considering nature has been to place its forces in the service of men, to free their minds of a crushing weight of superstition arising from ignorance of its laws, and to reveal to them the physical conditions of healthful living. The mental effect of the study of natural law is to awaken and nourish enthusiasm for the true as such, to discard authority, and to trust only vigor of reasoning in searching for natural laws, and to believe in their unassailable validity when once discovered and adequately tested. These are valuable results, for great has

been the weight of woe suffered by mankind because their coming has been so long delayed. Let us call to witness the baseless terrors arising from erroneous belief regarding natural causes, the needless famines, diseases, and devastating pestilences that have afflicted mankind, and then the more lamentable perversion of noble human qualities themselves through blind adherence to authority, or by the injection into human affairs of the devils generated by ignorance of natural law, as in witchcraft or in the Spanish inquisition, thus poisoning the mind with the ptomaines of its own diseased thinking. Modern natural science has moreover diminished pessimism in the world, in that on the one hand the doctrine of evolution has given hope to those who had it not, since it shows how the world of man as well as that of physical nature has risen and will still rise in the scale of being through the growth engendered by inward force and outward circumstance; while on the other it furnishes an ever growing expansion of the material necessities for higher standards of life for even greater populations. The educational importance both to the individual and to society of forming such a view of the world and of mastering the means for its realization can hardly be overestimated. Once men thought the only fountain of youth and hope springs from the art and literature of the Greeks, now they know that there is another no less quickening that flows from the science of the moderns.

Turning now to an examination of causes and effects in the humanities, we find an element of uncertainty, of contingency, due to the admixture of a subjective element. Buckle in his "History of Civilization" failed to prove his thesis, that historical effects spring alone from physical causes, and that consequently history is only a branch of natural science. He helped, however, to correct the equally one-sided view of Hegel in his "Philosophy of History," that historical effects are purely subjective, though hardly capricious, since they spring from the inner nature of man. If history is not natural science, neither is it psychology.

How, asks Helmholtz,[1] in his lecture on the relation of the natural sciences to the whole of science, will an ambitious man act? Can we predict with the certainty of natural law? Is there not room for caprice, for free volition, for varying mood? Are not the laws of ambition, if there be such, subject to exceptions that cannot with certainty be foretold?

Even where there are laws of human action that approach in certainty to those of physical nature, their discovery is of such extraordinary difficulty, that there is always room for the introduction of surmise and authority. When we find it difficult to establish a law, we are disposed to trust the man who says he knows what it is. Of this at least we may be sure; namely, that nowhere in human

[1] "Populäre Vorträge," Vol. I.

affairs do we find the reign of mathematical law as in physics; no proposition in literature, art, or history, however true it may chance to be, appeals to us with the certainty that attaches to a law of algebra or geometry when once it is understood. Generalizations in literature, art, and history are attained by a species of reasoning that Helmholtz calls *artistic induction*, and are frequently favored by many a happy, lightning-like inspiration, or lucky insight. This is often found in history and literature, and is essential in all true art. "It is an essential part of artistic talent to be able to reflect the outer characteristics of a subject through word, form, and color, and to conceive by a kind of instinctive apprehension how the mental status must develop, without being guided therein by any fixed rule. On the contrary, when we notice that an artist has consciously worked according to fixed laws and abstractions, we pronounce his work poor and trivial and our admiration is at an end. The natural sciences are able to express their inductions in sharply defined rules and laws, whereas the sciences that deal with man have for the most part to do with reasoning that is guided by a psychological feeling of tact." [1]

It is in the department of grammar that we approach nearest to the strict logical reasoning of natural science. There is a substratum of logical nature in subject, verb, and attribute, and in their respective modifiers and con-

[1] Helmholtz, "Vorträge," I, pp. 15–16.

nectives. But the concrete grammar of any tongue has to do with the language as it has developed without any conscious logical direction. Speech is therefore full of idioms that refuse to be parsed, while practically all rules of syntax are violated by numerous exceptions.

This introduction of psychic forces in the shaping of the life of man has, however, great educational advantages. Evolution, for example, is no longer animal in character, wherein every individual is the enemy of every other as soon as there is competition for the means of survival; but it is human and hence coöperative. It admits of benevolence and mutual helpfulness; it enables men to set the forces of nature to work to feed, clothe, shelter, educate, comfort, inspire, and protect all; it impels them to form themselves into groups, large and small, permanent and temporary, that they may secure in institutional form every advance made by individual or community.

Furthermore, the nature of the humanities impels men to pass beyond efficient or practical causes, and to search for final or ultimate causes. They try to discover not only mechanical causes and effects, but also the ends which mechanical causes serve. In other words, the humanities show not only what must be, but also what ought to be. They define the laws that should govern conduct; they nourish alike the rational and the spiritual powers of men; they help explain and perfect institutions, thereby increasing social happiness and well-being, and

equipping the youth with a wholly human and beneficent view of the world.

Yet, notwithstanding this striking difference between the natural sciences and the humanities in their attitude toward final causes, it would be an error to overlook the fact that in the biological sciences especially the conception of natural forces working to an end, which if unconscious and non-moral, is still teleological in the sense of a final cause, forms a working basis for many modern men of science. To be sure, no real scientist can accept the old notions of external teleology, in which the observer thought he saw in organisms as now adjusted an evidence of divine architecture which according to a preconceived plan fitted each organ for its perfect work, and possibly the whole creature for the needs of men. This view must now be rejected, since the scientist knows that organs have become what they are through development, through long ages of adaptation to ever changing environments; and he is convinced, moreover, that this generally upward striving in the battle for existence has necessarily been for the sake of the animal itself, and not for the sake of some other creature, say man, who would like to devour it, or use it for purposes of his own.

The rejection of this external teleology, however, does not exclude the possibility of one more rational, deep-lying, and inherent to the nature of the living thing itself. Everywhere we see plants and animals transforming the

raw material of nature found in earth and air and shaping it into new forms in accordance with some indwelling force, ideal, or plan.[1] Plant an acorn anywhere in the world, and it will strive to become an oak tree, noble and generous where the conditions are favorable to its growth, and dwarfed where they are unfavorable, — but in essential plan an oak tree always. Here then in this conception of nature we have a link that unites mechanical and final causes, and an easy transition from the unconscious aim-accordant forces of nature to the conscious moral aims of human kind. The student of the history of philosophy does not need to be told how vital this *Zweckbegriff* was to the thinking of the ancients. A paragraph from Willmann's "Didaktik" sets the whole matter in a clear light: "The inner nerve which unites the moral and the natural sciences is the *Zweckbegriff* (*i.e.*, the notion of inner forces working according to immanent purposes). This nerve modern research has — let us not say severed, but greatly neglected and permitted to lose in guiding power. The idea of end or aim was a metaphysical principle with ancient idealism, the good being considered as the final cause, not only of effort, but also of that which occurred; with this view, thought was antecedent to the material world, reason came before nature, the complete before the incomplete, freedom before necessity. Francis Bacon attacked this view and, with a brilliant turn, compared

[1] See Baldwin's article, "Teleology," in "Johnson's Cyclopedia."

final causes to vestal virgins — worthy of reverence, but unfruitful. Modern research has adopted this view, and has made the mechanical displace the older organic conception of nature. By so doing it has achieved extraordinary results in the individual sciences, but it has at the same time isolated itself from the moral sciences and made itself a stranger to an ideal conception of things. Partial truth, however fruitful, comes to this: — practical applicability at the expense of the whole truth is too dearly bought: vestal virgins, though unfruitful, were still not useless; they preserved the sacred fire and their virtue dignified and consecrated their whole sex."

Discussion: — Old and new conceptions of *teleology* and their present validity.

What æsthetic differences are there between these two departments of knowledge? It is true in a sense that natural science has nothing whatever to do with æsthetics, for its purpose is to discover or interpret fact, to establish laws, and to trace their effects. Yet we know that it is difficult for an astronomer not to be a poet, so powerfully do the beauty and majesty of the heavens impress him; there is a species of beauty in mathematical demonstrations, and indeed one may say an æsthetic quality both in physical law and in the adjustment of form to function everywhere seen in life whenever we contemplate them from the standpoint of their ideal value. But when all

legitimate claims have been allowed, it must be evident that æsthetics in natural science is so much a subordinate consideration that with many men of science it may be entirely dissociated from their scientific investigations. Much of our sense of the beautiful is indeed associated with things of nature, such as flowers, birds, human forms, falling rivers, and flaming volcanoes, but the æsthetic appreciation directly awakened by contemplation of nature is not a part of science.

Those departments of the humanities, however, that belong to what we call art, such as poetry, music, drawing, painting, design, etc., are distinctly æsthetic, for art has not only a sense medium, as seen in word, form, tone, color, and material, but it has also an elevating indwelling ideal, now showing the perfect balance of spirit and body, as in Greek statuary, now the volitions or impulses of mankind. Art reveals to man both the beauties of nature and the treasures of the human spirit; it is inspired not alone by the cold glory of the snowflake, but also by the glowing feelings or the inspiring conceptions of moral and spiritual beings. It is consequently both the source and the expression of the highest human æsthetic attributes.

We must not conclude, however, that because these differences between natural sciences and the art division of the humanities exist, we ought therefore choose the one and reject the other; for difference of kind is only difference, not the mark of inferiority or superiority.

Discussion:— 1. Compare the æsthetics of mathematics with that of literature; 2. that of astronomy with that of sculpture.

Finally, how do the humanities compare with the natural sciences in the domain which we call the good? Here we must first distinguish between subjects which by analogy may merely suggest goodness, and those which directly reveal it, since they have to do with the motives and volitions of men. The natural sciences belong to the first class, for the will of man has no part in the causes and effects of the physical world. Study of these forces, however, may elevate the mind and in a way point to a power that transcends them.

Yet when we carefully examine the content of natural science, we find, not good in the moral sense, but only necessity, the inevitable results of irrevocable law. In the world of life we have biological development, which favors the strong, but crushes the weak. It is the struggle for existence, the survival of the fittest, the upward progress of the whole through plant and animal evolution that knows no moral motive, no good-will, no mutual helpfulness in the human sense of the term.

In itself alone, a recognition of the unchanging laws of nature simply helps to make men prudent. The case is quite different when we come to literature, art, and history. These have to do with the ideals and conduct of men, and have the power, therefore, of revealing motive and volition. In this sense these subjects have a moral

content that the natural sciences lack. As above explained, they displace animal by human evolution in conscious effort, in which coöperation and mutual helpfulness take the place of a deadly unconscious struggle for existence. In these subjects we have a revelation positive or negative of good-will, benevolence, sympathy, love. Through them we learn the true form of institutional life as seen in group coöperation. Evil is here recognized as degeneration and departure from the forms of social well-being. Through the humanities we get our moral view of the world, our attitude toward our fellows; from them we draw our ideals and impulses for social life.

If then the natural sciences make men prudent, the humanities give them moral insight, ideals, and inspirations.

Discussion: — 1. Basis for the claim that the sciences stand on a par with the humanities in their influence upon the development of character. 2. What differences are discernible?

2. Detailed Study of Educational Values

We may now pass from this general inquiry to a special investigation of the educational function of the various study groups, and, as far as practicable, of the separate subjects within the groups. This function, as already indicated, can be adequately determined only by an analysis of content; not by any vague theory of a mystical 'indefinable somewhat' that may be conceived as emanating from them.

A. The Natural Sciences

GROUP I. THE EXACT SCIENCES

(1) *Mathematics*

When we speak of mathematics in the high school we mean primarily algebra, geometry, and plane trigonometry. What important specific contributions are these subjects calculated to furnish in the education of youth? Why, even in the days of antiquity, was mathematics so highly esteemed as a discipline for the young? The reason is not far to seek, for the world is so constituted that it cannot be apprehended without some means for discovering and measuring its quantitative relations. In the early days of reflection, when men began to search for bottom principles in the constitution of things, it was inevitable that they should come to the ideas of number and form as necessary to the very existence of the world, for whatever fills space and time must be subject to geometrical and numerical laws; hence the saying of the Pythagoreans: "What is the wisest? *Number.* And what next? *Man,* who gave names to things." Mathematics and language, then, are the two fundamentals in the world, and presumably also in education.

But what, we must ask, is the educational function of this quantitative study? In what does its peculiar essence consist? Aristotle[1] himself asked why a youth

[1] "Ethics," Ch. VI, p. 9.

may become a mathematician, but hardly a scientist, and gave this reason: Mathematics rests upon insight into principles which appeal to the mind as unconditionally and necessarily valid as soon as they are understood; but science presupposes experience also, *i.e.*, observation, experiment, hypothesis, verification, theory. The possibility of progressive insight into mathematical truths comes early, but ripened experience and the possibility of constructing a science from it come late.

From this unconditional and necessary validity of mathematics there arise a number of advantages not found in equal degree in any other subject.

Here in the first place is knowledge of whose certitude there can be no question, which is not subject to the caprice, opinion, or volition of men. Here there is no authority but that of the truth itself. Certainly in the realm of mathematics the favorite aphorism of Lucretia Mott holds with unquestioned force, "Truth for authority; not authority for truth." Mathematics has to do, not with memorized and transmitted traditions, or with superstitions and beliefs hoary with age, it may be, but with a system of demonstrable propositions developing from a few self-evident truths that appeal to the understanding with a directness and convincing certainty found nowhere else.

DISCUSSION: — Is training in an exact science the best preparation for the pursuit of an inexact one?

Next after certitude in educational importance we may perhaps reckon the progressive nature of algebra and geometry, indeed of mathematics as a whole. Starting from the most elementary stages of mathematical insight, each of these subjects, the one in the realm of time, the other in that of space, proceeds in unbroken order to ever higher generalizations, which assume manifold relations to each other, and which in turn lay the foundations for still further advancement. There is consequently a never ending series of definitions, principles, combinations, and demonstrations that reward the mind for its past efforts and stimulate it to ever renewed exertions. The following quotation from Bernhardi shows in vivid manner the progressive character of the science: "Mathematics as a system consists of sharply defined members, which, however, have the most intimate connection; these members rise in an ascending series, and in their upward progress give rise to more and more intricate and difficult combinations, like concentric rings starting from one and the same central point; yet with this difference, the individual members appeal to the same qualities of mind, and each proposition is a whole in itself, yet also a representative of the entire science. This construction of mathematics makes each member a separate end for effort and gives the mind, when once this end has been reached, the feeling of accomplishment, and yet at the same time because of the strict connection of parts, one of longing,

the wish to advance. The conditions of progress are most easily secured by following this progressive, upward movement, and the mental powers gain in breadth by progress through the homogeneous parts of the science, being at the same time stimulated to greater depth."[1]

Mathematics has been highly esteemed as a propædeutic for other subjects, for whatever needs to be measured or quantitatively determined must rely upon the respective departments of this science. It not unfrequently happens that some phase of mathematics is overvalued, thus leading to sterility of result in the department concerned or to indifference on the part of the learner. The most noted instance of this overvaluation relates to the function of mathematics as an exercise in formal logic. In discussing mathematics and physics in secondary education, Schellbach remarks: "Among the educated classes we meet everywhere the error that mathematics is chiefly useful in education as applied logic, even if it is limited to a minimum of content. This error finds its explanation in a number of circumstances, of which two are of especial importance; first, in the common ignorance of the manifoldness of mental processes, methods, and ideas involved in secondary mathematics, and, second, in the erroneous conception of the notion of formal discipline, which does not perceive that form and content are inseparably united." In this connection

[1] Compare Willmann, "Didaktik," Vol. II, pp. 132–133.

Frederick Meyer says, "Were the mere logical side of this subject sharply and repeatedly brought to the front, it is probable that the interest of bright minds in mathematics would soon be extinguished." Yet, it would be unwisdom to overlook the influence that the logical vigor, say of geometry, has upon the plastic mind of youth. Thus, it is related of Abraham Lincoln when as a young man he first read the plane geometry of Euclid that he exclaimed, "Now I know what an argument is; now I understand when a proposition is proved."

It is when we examine the relation of mathematics to science, both pure and applied, that we see most forcibly its indispensability as a propædeutic. Astronomy was once studied almost exclusively as a mathematical science, as in the days of Copernicus, Kepler, and Newton, and still has its mathematical side. So dependent is any precise and advanced study of physics upon mathematics that it is to be reckoned at once as a mathematical science, though, as will be seen later, physics has important aspects of educational worth not found in mathematics. With chemistry the dependence upon mathematics is much less, though here we have the laws of constant relations, multiple proportions, chemical formulas and equations. In history we have chronology; in sociology, statistics; in æsthetics, laws of proportion and of sound; and in psychophysics, quantitative measurements of stimulus and response. High-school algebra and geometry and

trigonometry supply in large measure the quantitative laws which are applied in architecture, sculpture, engineering, military science, and navigation. It is through well-selected problems for solution that the student is made fully conscious of the intimate dependence of many pure and applied sciences upon the mathematics even of the high school; and this consciousness of practical worth often outweighs with the youth all the mental values of which he may hear, but of which he has no adequate conception.

Discussion: — If the value of mathematics as applied logic is small, and the student is to pursue none of the sciences mentioned, what is the educational justification of requiring him to master algebra, geometry, and trigonometry?

It is highly desirable that teachers and parents, especially, should have a clear apprehension of the mental traits that are specifically cultivated by a study of mathematics. From the foregoing analysis of content we can easily comprehend that this subject is preëminent in its power to train the mind in form and number to exact and progressive thinking, to adequacy of conception and precision of expression, to energy of attention, to clearness of inner vision, to perception of necessary truths, and to the habit of seeking in its proper realm, not the conjectural, but the certain, for there is no "of course" in mathematics, since even the self-evident must be proved. If in behalf

of language Hegel could say, "He who knows not the Ancients has lived without knowing what beauty is," so Schellbach can reply, "He who has not known mathematics and its results in natural science has died without knowing what truth is."[1] Mathematics, moreover, helps to quicken the scientific conscience by making the student unsatisfied with inaccurate and inadequate knowledge, and with expression that lacks precision or apprehension that does not arrive at full comprehension. It thus becomes a school of scientific thinking, terminology, and expression.

DISCUSSION: — To what extent is the confidence begotten by successful study of mathematics useful in non-mathematical departments of life?

Another mental aspect of the educational value of mathematics is the training it gives in the constructive imagination, for there is everywhere in mathematics a demand for the exercise of free creative power, whether in the solution of problems, in geometrical constructions, in the formation of equations, or the discovery of principles and proofs. "The feeling of elation that accompanies this creative activity produces the future mathematician." Jacob Steiner can exclaim, "We too are poets!" and Emil Lampe in his speech at the celebration of the Kaiser's birthday at Berlin in 1893 says, "In the development of new theories the mathematician needs as keen a creative

[1] Baumeister, "Handbuch," Vol. IV, p. 21.

imagination as does the creative artist." Notwithstanding the truth that underlies these claims, it would be the height of educational unwisdom to confound the mathematical with the poetic exercise of the imagination, and to conclude that the one is the equivalent of the other; for, though both may be designated "imagination," they are as far apart as are the thoughts from which they spring and to which they cleave. The one is illuminated by the electric light of insight, the other is made to glow with the heat of feeling.

Mathematics stands first among the subjects of the high-school curriculum in the magnitude of its demand upon the 'logical,' or 'rational,' and the smallness of its demand upon the 'mechanical' memory. This again arises from the nature of its contents. Without insight no mechanical memorizing is valuable in this department of knowledge, and with it little is necessary. Every teacher of geometry, for instance, knows that the student is lost who tries to make good his lack of insight into the logical steps of a demonstration by his diligence in memorizing the demonstration as it stands in the book.

The foregoing sketch gives an outline of the educational worth of mathematics as based upon the nature of its contents, but an exposition of its limitations which are as striking as its advantages, and its comparative value can be undertaken only in connection with the subjects still to be discussed.

DISCUSSION: — Importance in the education (*a*) of boys, (*b*) of girls, of the following elements in mathematics: 1. certitude; 2. progress in complexity and abstractness; 3. propædeutic for pure and applied science; 4. training in imagination and memory.

(2) *Physics*

Physics as a subject for high-school instruction has a double advantage, in that it is both mathematical and experimental. In so far as it is mathematical, it furnishes a concrete field for the application of the generalizations of algebra and geometry, and consequently shares with these subjects their apodictic certainty and their freedom from human bias. As an experimental science it has a great advantage in the fact that the observations made in the experiments must be vitalized with thought in order to be effective. There is in physics no mere staring at phenomena with whose appearance the observer has nothing to do, but on the contrary the things to be observed are produced by the student himself through the experiments he makes. Should the first observation not be conclusive, the experiment may be repeated until the student is satisfied that he has not only seen but understood. This form of observation offers an exceptionally fine field for self-activity of an educative nature, a field which is continually broadened by the ever increasing laboratory facilities that are being provided in public and private high schools.

Discussion: — Compare observation in physics with observation in biology. See Section 50.

Starting with the twofold basis of mathematics and observation of experimentally produced phenomena, it can be seen that physics is capable of performing important educational functions, a few of which may be briefly noted: —

(1) It awakens anew that fresh, spontaneous interest of childhood in the events of the physical world which the schools have unfortunately put to sleep, for it has the most striking connection with the material progress of the world; as, for example, the manifold and amazing results in the realm of electricity, — the telegraph, telephone, telautograph, wireless telegraphy; also the many forms and uses of steam, gas, water and electric motors; microscopes, telescopes, spectroscopes (spectrum analysis), and other instruments, and then such modern wonders as liquid air, X-rays, radium, etc. Not the least advantage in thus reawakening the speculative interest in natural phenomena, is the fact that the rapid development of physics is constantly producing new wonders to stimulate and strengthen this interest.

(2) Physics enables the student to lay the foundation and to build the superstructure of his knowledge of the facts and laws of the mechanical world through mathematical insight and thought-saturated observation. Just as geometry may be developed from a few self-evident

propositions, or axioms, so physics may start with facts lying within the immediate experience of the student, and enable him, step by step, to construct for himself through his own experiments and thinking a body of knowledge that is free from the uncertainties of opinion and authority. Here there need be no ballast of historical data, dogmas, doctrines, or exceptions. The absence of these characteristics relieves the subject of the need of the memory-cram felt to be essential in many of the humanities.

(3) It forms a welcome counterpart to the training necessitated by the nature of the content of literary, artistic, and historical studies, as already indicated in a general way in the comparison of the natural sciences with the humanities. Helmholtz calls attention to this as a result of his own experience with students trained solely in philological subjects. He says, " What has been noticeable in my experience with students who pass from literary schools to scientific and medical studies, is, first, a certain laxity in the application of laws that are universally valid. The grammatical rules upon which they have been exercised are in fact accompanied with long lists of exceptions, and the students are consequently unaccustomed to trust to the certainty of the legitimate consequences of strictly universal laws. Second, I find them much inclined to rely upon authorities, even where they could form their own judgment. In philological studies even the best of teachers must refer the student to authorities,

because frequently he cannot compass the whole subject, and because the decision often depends upon æsthetic feeling for beauty of expression, which demands long training. Both defects rest upon a certain inertia and uncertainty of thinking, which will be injurious not alone in science studies. The best remedy for both defects lies in studies of a mathematical nature, for in them there is absolute certainty of reasoning, and no authority rules but that of the understanding itself."

(4) In an industrial society, physics has an important office to perform in fitting men and women not only for specific callings, but for the capacity to adapt themselves readily to new callings. The machine has taken the place formerly occupied by the tool; the factory has superseded the workbench. It is highly desirable, therefore, that the student should be master of the principles of machine construction and operation. This mastery of principles enables him not only to understand new machines, but to become quickly an adept in their management. It enables him to judge of the value of new inventions, also inciting and controlling his own impulses in this direction. The practical advantages incident to the study of physics are elaborated by Spencer in the first chapter of his "Education."

Discussion: — 1. Extent to which physics should become a universal study: (*a*) for boys, (*b*) for girls. 2. Need of physics as a preparation for the various professions.

(3) *Chemistry*

An examination into the nature of chemistry shows it to be an inductive science essentially non-mathematical, with a fascinating history and a marvellous utility in modern industry. It has been developed through countless experiments, and to be effective educationally must be taught in the same way.

Unlike physics, the phenomena with which it deals, with a few exceptions, are not open to observation in the routine of daily life, but must first be produced under artificial conditions. This is its first difficulty.

Its second difficulty is due to the fact that the changes with which it deals cannot be observed by the senses, since they take place among the ultimate constituent particles (atoms, molecules) of matter. The experiment begins with certain materials, introduces certain conditions (juxtaposition, change of temperature, etc.), and concludes with certain results. The problem is to discover what chemical changes have taken place. This is a thought problem, which, if at the advance threshold of the science, demands a full use of known related facts or laws, and then fertility in the forming of hypotheses and dexterity in testing them, until the true cause stands revealed. Should the problem lie merely at the threshold of the student's knowledge, the same order (observation, hypothesis, verification) is maintained, but the discovery

of the true cause is abbreviated by the guidance of the teacher and his skill in proposing such problems only as the student with his present acquisition can hope to solve. Should the problem be to find the constituent parts of a mixture, the student is called upon to apply tests suggested by his previous experience, and then to form a series of hypotheses, each of which in turn is tested by the aid of previous knowledge, until the constituent materials are one by one discovered. Here is a direct challenge to the student's fertility of resource, and his persistence in effort, in which are involved the mental tension caused by expectation, and alert, thoughtful observation.

Discussion: — Comparison of experiments in physics and in chemistry, showing their likenesses, differences, and educational effects.

A concrete problem taken from elementary chemistry will suffice to show the kind of mental activity involved in chemical experimentation. Suppose the problem is to find the cause of the formation of the ash-like substance seen upon the surface of base metals when they are heated.

The first thing to do is to heat the metal or metals in an open retort, when observation quickly shows the 'ash.' It will conduce not a little to the student's interest to learn that many centuries had to pass before men learned the true cause. An explanation of scientific method (observa-

tion, hypothesis, and verification) will prepare for the solution of this problem, and show the worth of exact and complete, and the worthlessness of inexact and incomplete observation. Since a knowledge of the truth can be adequately obtained only through the student's own thought, he is asked to propose a hypothesis as to the cause of this ash-forming seen on heated metals. Of course it will occur to him that the heat is a cause, but he will suspect that it is not the only one. It will easily occur to him that the air is present, and may perhaps be excluded. The teacher may suggest that it be displaced by hydrogen, which for the present is to be considered merely as a means for excluding the air. If now the heated metal remains untarnished in a stream of hydrogen, and the student is convinced that the air has something to do with the corroding of the metal, it is certain that this conviction will be confirmed and strengthened when he sees that with the return of the air the familiar color reappears on the heated metal. Even if it now seems to be proved that without the presence of the air the metal cannot change, that therefore the air exerts a direct influence in the change, yet the nature of this influence is still unknown. Further experiments (lessening of the volume of the air and changes in it caused by contact with the hot metal and increase in weight of the latter) lead the student through similar mental processes to be certain that the so-called 'ashes' on the hot metals are nothing more than combinations

of the latter with that part of the air which, without knowing what it is, one may say with confidence is the part that is most active in the burning of combustible bodies. The production of oxygen out of oxide of mercury, which immediately follows, brings this series of experiments to a close. Here follows naturally a glimpse over the history of this discovery: Knowledge of the ancients about 'ashes,' later called 'lime,' as well as the erroneous views of the nature of metals and their 'ashes' during the middle ages and later times, from Geber (800) to Stahl (1697); the complete overlooking of the influence of air and the consequent erroneous view that the cause of the corrosion lay in the metals themselves, and that consequently they might be changed to precious metals (the efforts to change base metals into gold lasted for 1500 years); the proposal of the *phlogiston* theory, which, though recognizing the 'calcifying' influence of the air, fell into another error by failing properly to observe the change of weight in the latter and the final elimination of this error by Lavoisier.[1]

The foregoing example gives an intimation of the mental processes involved in an experimental study of chemistry, as well as of the intensity and quality of interest that it is possible to arouse in the subject.

A brief summary of the most striking characteristics of chemistry as a subject of instruction may help the teacher

[1] Compare Baumeister, "Handbuch," Vol. IV, pp. xiv, 15–16.

to form a still more adequate idea of its place and function in education: —

(1) It is essentially non-mathematical and strictly inductive, so far as it is educative. Brevity of time and mass of desirable material may make memorizing of unverified facts and laws imperative at times, yet the real teacher will see to it that the subject is scientifically treated in numerous types of chemical investigation.

(2) Though a school subject, it yet admits of abbreviated investigation of important problems on the part of the student in strict scientific form (observation of fact, hypothesis as to cause, testing and verification of the hypothesis). The method of the classroom is, therefore, that of the research laboratory.

(3) As a laboratory subject, it shares with physics the advantage of inciting the student to use all his abilities, mental and physical, in the solution of problems.

(4) Chemistry stands closer to technology than physics even, and because of this fact may have, even in the high school, the stimulating effect of a professional study. A mere glimpse at the function of chemistry in industrial life shows its immense practical importance: chemistry of iron and steel; reduction of ores; refining of oil and sugar; manufacturing of dyes, starch, beer, wines, gas, paper, leather, lime, cement, soap, fertilizers, extracts; the proper nourishment of the human body, care of health, disinfectants, sanitation; to say nothing of its first great

function after the attempts at transmutation were given up, namely, the production of medicines.

Discussion: — Comparison of mathematics, physics, and chemistry in the following respects: 1. kind of observation required; 2. nature of experiment; 3. quality of constructive imagination involved; 4. certitude of results; 5. progressive nature of problems to be solved; 6. demands upon memory; 7. appeal to inductive and to deductive reasoning.

(4) *Astronomy*

This subject, in so far as it demands higher mathematics, photography, spectrum analysis, and the telescope, belongs not to high-school but to university instruction. It is only as a part of geography that it is adapted to secondary education, so that a separate discussion of its educational merits is not needed.

Discussion: — Educative value of brief popular courses in astronomy.

GROUP II. THE BIOLOGICAL SCIENCES

Botany, Zoölogy, and Physiology

We pass now from the exact to the inexact sciences, from subjects that are quantitative to those that are qualitative, from the rule of mechanical or chemical law to the law of life. This is a part of the world that is dominated by a new principle, that of growth, of organic development, of adaptation to environment, of evolution in the domain

of living beings. It has to do with organic bodies in which organs are at once means and end. As organs, or means, they serve the whole being; while as ends they are in turn served by the entire organism (nourished by the processes of digestion and circulation, protected from harm, etc.).

As the content and ruling principles of biology are different from those of the exact sciences, so it is natural that the educational functions should also be different. Biological sciences are also observational, but in a different sense. Without a knowledge of the facts and laws of the living world, the observational training obtained in chemistry would be of small worth in botany or zoölogy, for not only is observation bound up with thinking, it is also conditioned by apperception, by knowledge and experience in the domain concerned.[1] Observational training in biology, therefore, stands in a class by itself; it has no equivalent in the curriculum, for no other subject has to do with the germination, growth, nourishment, and evolution of living things, their qualities, conditions of health or disease, vital processes, life history, classification, economic and æsthetic functions. This topic is treated at length in Vol. II.

Biology is also an inductive science like chemistry, but with a different class of materials and an entirely different tone as regards rigor of logical process. Analogy plays a

[1] See F. Adams, "Herbartian Psychology Applied to Education," Ch. VI; also Lange, "Apperception."

larger rôle than in chemistry, anatomical comparison over a wide range of groups is needed for its larger generalizations, while many of its ultimate formulas still linger in the domain of doctrines, hypotheses, and theories. Inspiring, uplifting, and expanding they may be to the mind, but they have not been demonstrated in the exact sense in which the term is used in mathematics, physics, or chemistry. Think, for example, of the difference of view among men of science as to whether acquired characteristics are inherited or not.

Another difference between biological and physical sciences lies in the study of the function of organs or parts. For what end does the leaf exist? the stamen? the bark? the iris? the vermiform appendix? In the answering of such questions and similar ones regarding structure and location of parts, there is abundant room for observation and inductive reasoning, but of a quality not found in the exact sciences; for in the latter the idea of the function of a part in ministering to the whole does not occur, since they do not deal with organisms, but with mechanical relations or chemical reactions.

If mathematics and physics are remembered chiefly through insight into their principles, the knowledge acquired in biological sciences is held predominantly through what the Germans call *Begriffe*, that is, through organization into *classes*. So prominent is this fact that Bain calls botany and zoölogy the sciences of classification. Once

master the characteristics of a class, and the observer has at once a means for the identification of individuals which enables him to hold a vast array of facts within the grasp of a memory perhaps not of the strongest.

DISCUSSION: — Educational worth of biological training in classification.

These sciences are peculiar also in that they deal with living things, or with things considered as if they were living. The laboratory is therefore extended to the open field, thus relieving the student from at least a part of the constraint of the schoolroom. The study of the wonders of living organisms may easily lead to sympathetic regard for animals and plants, and in this way produce an emotional tone quite different from that natural to quantitative science, for though one might be said to 'love' a geometrical proposition or a chemical demonstration, it is not the same kind of affection as that which may easily be cultivated for plants and animals. That this sympathetic regard for the animal world is not always the result of biological teaching is a lamentable fact, due to callousness or carelessness on the part of the teacher.

DISCUSSION: — Comparison of an experiment in physics, with one in chemistry and one in botany, to show likenesses and differences.

A word, at least, may be said concerning the economic importance of having these subjects taught in the

high school. The proper understanding and utilization of plants and animals lie at the basis of our agricultural, horticultural, and industrial prosperity, for not only do plants and animals furnish practically the whole supply of food and clothing for mankind, but they also constitute the main source of raw materials for manufacture, and are consequently the very life blood of commerce. It is not enough that a few specialists from the universities should maintain experiment stations and tell the people what to do; there must be a substratum of botanical and zoölogical knowledge and interest on the part of the people themselves in order to make the experimental results of the specialist of value to the community. It is said that he is a benefactor of the race who can make two blades of grass grow where one grew before; he is, if he can teach and persuade all growers of grass to do the same, otherwise his extra blade will be of small service. The farms of the more fertile parts of the Mississippi basin have doubled in value during the last fifteen years, mainly because the research of the specialist was met by the intelligence of the farmers. It will always be fundamental to our industrial well-being for the high schools to lay the basis for a widespread popular interest in the study of plants and animals that there may be transmitted to the masses the practical results of higher research.

Discussion: — What would be an ideal course in biology in a high-school course in agriculture?

Of all the pleas that Spencer[1] makes for the sciences as guides to life for the individual, that for physiology is the most convincing, for the problems of hygienic living are always personal and persistent, as are those that pertain to food, stimulants, narcotics, clothing, and shelter. The modern urban and industrial development has also brought with it a host of new temptations, dangers, and difficulties, such as a sugar and otherwise superabundant diet, a sedentary life for young and old, excessive nervous strain, and social amusements for which the past development of men has not prepared them. So far as food is concerned, the old danger was famine; the new danger is a kind of refined gluttony, for it is undoubtedly the case in prosperous communities that far more men and women die from overeating and drinking, combined with under-exercise and nervous strain, than from lack of food.[2] This new danger incident to industrial plenty must be met by better and more extensive instruction in physiology and hygiene. Consequently the teacher is to be pardoned if he urges the practical, rather than the strictly educational function of this study. At any rate, for whatever reason he likes, he may urge a fundamental study of human physiology, in the high-school meaning of the term: the nature and function of the vital processes, like digestion and

[1] "Education," Ch. I.

[2] See S. N. Patten, "The Development of English Thought," pp. 379-387.

circulation; the functions, and limits of endurance of the central nervous system; and especially the general laws of hygiene.

Even if for no other reason, educational or economic, the study of botany and zoölogy is worthy of a place in every high school as an inexhaustible source of unselfish pleasure, comfort, and mental health and healing. Even the ancients recognized the importance of such study for similar reasons. Aristotle, in a noteworthy section of his treatise on the component parts of animals, contrasts two species of natural objects: the heavenly bodies, which in accordance with his predecessors he holds to be divine and inaccessible, and the plants and animals, "which are related to us by a certain community of life." "Both species of beings," he goes on to say, "have their interest; of the first we are able to comprehend but little, though the sublimity of the subject makes this knowledge more valuable than that of the world which surrounds us. On the other hand, the world about us has the advantage of furnishing us with more complete knowledge, which because the objects are closer to us and more intimately related to our nature we are warranted in placing alongside the investigation of those sublime existences. To him who has insight and is able to go back to the sources, living nature offers unspeakable pleasure, even with objects that do not flatter our sensibilities. It would be foolish and unbecoming were we to amuse ourselves with the mere contemplation of such

objects as they are portrayed in painting and statuary, rather than to study the natural objects themselves, whose causes we might seek out. We must not permit any childish repugnance to keep us from the study of the lower animals, since there is something wonderful in all the things of nature, and what Heraclitus said to the stranger who hesitated to enter when he saw the philosopher warming himself at the hearth holds likewise of them: 'You may enter with confidence; there are Gods here also.' Consequently we must exclude nothing in our investigation, since nature and beauty are found in all, — nature in adaptation to end and exclusion of accident, beauty as the summit of existence and development."

Discussion: — 1. Extent to which the biological sciences in the high school should introduce the student to the genetic and evolutionary point of view. 2. Is æsthetic enjoyment of nature a legitimate end of biological science?

GROUP III. THE EARTH SCIENCES

The chief representative of this group in the high school is geography, mathematical and physical. Geology is better fitted for university than for high-school instruction, since it is more remote from practical interests than most of the other natural sciences, and since it deals with generalizations of a very comprehensive nature. It is interesting to note in this connection, that when science had a broad basis of theory and a narrow one of demon-

strated law, astronomy was the science most universally taught in secondary schools, but that now when demonstrable law and practical applicability outweigh even the most glittering of unproved theories, astronomy is a study for the specialist in the university or the observatory. This does not mean that its glories have become dimmed; they have in fact grown infinitely brighter with the advance of mathematical knowledge and the invention of new instruments of research, like the telescope, the photographic plate, and the prisms for spectrum analysis. It does mean, however, that the newer sciences from their greater definiteness and demonstrability have become much better suited to the intellectual and economic needs of youth than the more splendid but also more indefinite and difficult astronomical science, which gratified the wonder of our predecessors. In a less striking manner perhaps, but no less surely, geology, once the centre of scientific interest, has now followed astronomy to the university, and has likewise become a subject more of special than of general study and research.

DISCUSSION: — Extent to which astronomy and geology may still claim a place in the high school.

Mathematical geography, as its name indicates, is mathematical in character and shares the educational advantages and limitations of mathematical subjects, as described in preceding sections. It has certain aspects,

however, peculiar to itself which make it worthy of the few weeks of attention needed for its mastery.

The specific end and aim of mathematical geography is the exact and adequate location in space of any given point upon the surface of the earth. To effect this end it is first necessary to obtain clear conceptions as to the form and magnitude of the earth, then to devise artificial means (lines of latitude and longitude) for locating places upon the surface of this sphere, and finally to acquire a full knowledge of the movements of the earth in space.

It can naturally be seen that these problems are mathematical, not in the sense of algebraic calculation or geometrical demonstration, but only in the formation of geometrical figures on a gigantic scale. The imagination is called upon, not only to construct figures, as in plane and solid geometry, but to extend them until they compass the whole magnitude of the earth, of the solar system, and of the celestial sphere. It is in training the mind to facility and accuracy in thus expanding its spatial images that the peculiar educational worth of mathematical geography lies. This may not be the greatest thing in education, but it is unique, and worth more than it costs.

A moment's consideration will show how this expansion of spatial images is effected in mathematical geography. Suppose the observer chooses a convenient spot out of doors on a cloudless night to watch the apparent move-

ments of the stars. He sees that they rise, describe arcs across the vault above, and at last set, or disappear from sight. Reflection shows him that the arcs described by the stars are parallel, and that chords joining the rising and setting points of the various stars must be likewise parallel, one of which must pass through the point where the observer stands. Then by conceiving another line at right angles to the first, the four cardinal points of the horizon are fixed. Another line at right angles to the plane of the first two will give the two points, Zenith and Nadir. Still another line conceived to be the axis of rotation will give the north and south poles. Then the conception of planes cutting the earth in various directions must be formed, of which four are great circles; namely, the horizon (the earth being first conceived as it appears, a circular plane), the meridians, the equator, and the first vertical, which contains the four points, east, west, zenith, and nadir. Then we see that the equator cuts the day and night circle into two equal sections, so that at the equator day and night are each always twelve hours long. The notion of small circles also cut by the day and night circle but unequally except twice a year must also be conceived. We have next to think of the earth as a sphere turning on its axis and bringing all points successively into the sunlight, whereby the day and night circle cuts unequally the parallels of latitude north and south of the equator, except twice a year; also of the earth as circling

about the sun, the plane of the orbit (the ecliptic) being bounded by the path of the earth, and we must picture the axis of the earth declined twenty-three and a half degrees from a perpendicular to this plane and always parallel to its former positions as it moves along. Then returning to the surface of the earth, we must see how the arctic and the antarctic circles are fixed, perceive how and why zones and seasons are formed, and so on until we can accurately locate any given point on the earth's surface with respect to any other east or west or north or south. Whoever stands beneath the starry sky and constructs all these lines, circles, and planes, fixes all these points and clearly sees the mutual relations of all as they lie in the great space above, beneath, and around him, will have no difficulty in comprehending what the essence of mathematical geography is, and wherein consists its specific educational function.

Discussion:—Function of maps, charts, and apparatus in giving students adequate conceptions of the foregoing.

General, advanced, or high-school geography appears under three chief aspects, according as the emphasis is laid (1) on the purely physical features of the earth, in which case we have physical geography as a branch of natural science; or (2) on the effect of natural causes upon the well-being of mankind, in which case we have anthropo-geography, the chief form of which with us is commer-

cial geography; or (3) somewhat equally upon physical laws and their effect upon mankind, in which case we have physico-anthropo-geography, which is Karl Ritter's conception of geography come to unity within itself and forming a connecting link between the natural and the historical sciences. Herbart conceived geography in this way and called it the *associating* science.

Recent physical geographies emanating from university centres emphasize the exposition of purely physical laws concerning land, ocean, and atmosphere, and content themselves with incidental reference to their effects upon man. High schools that have commercial courses, or that wish to emphasize the practical aspects of a study of geographical forces, are calling for commercial geographies.

A recent advocate of the Ritter conception is Professor Kirchhoff,[1] who thinks that needless confusion has been introduced into geographical teaching, especially in secondary education, by artificial division into mathematical, physical, political, commercial, and historical geography. He would bring these into unity, first, through a study of separate districts and countries which are minor geographic wholes (*Länderkunde*), home geography (*Heimatskunde*) being presupposed as an apperceiving basis; and second, in the high school, through a physico-anthropo-study of the earth as a heavenly body and the

[1] In Baumeister, "Handbuch," Vol. IV, XII, pp. 1–9.

home of man. The whole earth is studied as a macrocosm reflecting all its component minor unities, while the separate districts or countries are studied as *microcosms*, which though minor geographic unities still reflect and involve the whole. In other words, the study of the earth as such gathers up all the details of elementary geography, puts them into their proper relations, and gives the student a scientific grasp of that which he has previously learned as detail. "These," says Professor Kirchhoff, "are the two parts into which geography naturally separates.

"The general, or scientific geography views the earth as one of the planets of the solar system (mathematical geography), and then studies its atmosphere, its oceans, the structure of its land masses, the nature of rivers, glaciers, inland seas, lakes, the principles of plant and animal distribution, and the general reciprocal relations between the earth and mankind."

DISCUSSION: — 1. Is physical geography as a pure science of physiography justifiable in the high school? 2. Degree to which modern commercial geography satisfies the need of explaining the reciprocal relations between the earth and mankind.

The educational effects of geographical study will vary naturally according as one or the other of the aspects is emphasized. In general, however, it may be said that this subject unites in itself many of the advantages of the

exact and of the biological sciences, with others peculiar to itself. "Nothing," says Immanuel Kant, the first great German university teacher of this subject, "is better adapted to waken sound common sense than geography." It does this for two reasons chiefly; first, because it stimulates to a kind of thinking that is fundamental, one might almost say primitive, in character (think of primitive attempts to discover the component parts of the earth, the cause of geographical phenomena, and to explain the movements of the heavenly bodies), and second, because it has to do both with familiar phenomena and with human interests of great import. Nothing is more fascinating to the mind of youth, or more stimulating to his imagination, than his first organic view of the world as a whole, its development, its relation to other heavenly bodies, its interplay of forces, its influence upon the occupations, characteristics, and well-being of men. He delights to see, moreover, how men by thought and work can overcome natural disadvantages of climate and location, or by ingenuity and invention can utilize the natural geographical forces for his own advantage. Scientific geography furnishes us our first concrete view of evolutionary forces at work, and unites as nothing else can the world of nature and the doings of men.

Discussion: — Place and function in secondary education of each of the three kinds of advanced geography.

CHAPTER IV

FUNCTION AND RELATIVE EDUCATIONAL WORTH OF THE STUDIES AND STUDY GROUPS (*Continued*)

B. The Humanities

GROUP IV. LANGUAGES

(1) *Linguistics*

The opening discussion in Chapter III gave a general view of the permanent content and educational functions of linguistic and literary studies. The study of language both in form and content is the oldest discipline for the training of youth known to man since the invention of written speech, and in many countries during long periods almost the only one. Up to comparatively recent times mathematical knowledge was limited to the Euclidian geometry; the various physical, chemical, biological, and earth sciences were either rudimentary or in a speculative stage of development; modern languages were for the most part in their vulgar or non-literary condition; while economics as a science was non-existent, and history a mixture of tradition, fact, and fancy. Language, therefore, in addition to its own inherent worth and necessity as a subject of instruction became the recipient of

the time and attention that may now be given to subjects which were then not in a teachable state of development. Now, however, when these newer disciplines are full grown, and are demanding the place in education to which their importance and perfected development entitle them, it becomes necessary to analyze anew the content and educational effectiveness of language, in order that, on the one hand, it may not be overestimated and continue to receive the emphasis which circumstances gave it in the past; and, on the other, which is perhaps still more important, that it may not be undervalued, and gradually sink into a position lower than that to which its permanent worth entitles it.

A glance at the difference between the primitive and the cultured man with respect to the need of language training will throw much light upon its educational value. Primitive men secure the requisites for survival, not by a thoughtful direction of the forces about them, but by physical exertion in hunting and fishing, the herding of animals, or by means of crude agriculture. In such an existence but little language, and that of an inexact kind, is needed. A vocabulary of a few thousand words suffices to name the important phenomena that affect the people, and to express their narrow range of thought, feeling, and volition. The thought content of the language of such a people is exceedingly simple, since it pertains only to the most prosaic affairs of daily life. It has and needs no fine

discriminations, no sharply defined conceptions, no wide-reaching generalizations. (Some primitive people are unable to count beyond ten.) The feelings of men in this state are massive and tumultuous, pertaining to matters of survival, such as military and other defence, the procuring of food, and the perpetuation of the species. Such feelings find expression in action and inarticulate cries more than in language; as, for example, in the rage engendered by combat or by jealousy; the fear that expresses itself by flight, or uncontrolled emotion; the love that finds expression now in joyous exaltation or dumb repression or heroic deed, now in physical endurance of self-inflicted torture. The vernacular as passed down from parent to child suffices for men in a primitive state; there is here no need of training the young through language, for the ordinary intercourse of life gives them naturally and easily all that there is to give.[1]

The case is very different, however, when a caste, as in India; a religious group, as among the Hebrews or the Egyptians; or a class of freemen, as in Greece, begins deeply and seriously to reflect and to record its thoughts and emotions, its insights and inspirations, in religious works like the vedas and the Hebrew Scriptures, or in literature and philosophy as among the Greeks and more modern peoples. Such groups no longer get their subsistence at first hand from nature, but become the leaders

[1] W. D. Whitney, "Language and the Study of Language."

and in varying degrees the exploiters of their fellows — the tribute-takers. They lay the basis for civilization, however, developing the arts and sciences, and making it possible for the whole race to lift its standards of life and thought; through their writings, moreover, they secure the advances made, enabling men better to understand themselves, relieving them of at least a part of the superstitious fears that paralyze them, and inciting them to greater conquests over thought and nature. At this point the need for language training becomes imperative, for "*Die Kunst ist lang, und kurz ist unser Leben.*" Since the young must be placed rapidly in possession of the intellectual and moral treasures of the past, it is necessary to train them first to quick and accurate apprehension of what is written, and then to equip them with skill in the use of the language they have been taught to comprehend. In addition to these formal facilities, they must likewise be led to make these literary, philosophical, and religious treasures their own through reflective study. Thus, for example, we find the education of the highest caste of Hindoo youth centring about the vedas, in their manifold forms and subdivisions, grammar being the foundation of all instruction. The Brahman regarded language as a divinity, and dedicated hymns to it. Resting upon the work of many generations, Panini, who is supposed to have lived at the time of Alexander the Great, constructed a canonical doctrine of language which treated

the laws of the Sanscrit in eight books containing four thousand rules, said by Max Müller to be more complete than the whole grammatical literature of all other nations giving a purely empirical analysis of speech. In similar manner, but with no such emphasis upon grammar, the Hebrews after the exile, when the language of the scriptures was no longer that of common life, placed their religious books at the centre of all instruction. Chinese education for thousands of years has been exclusively literary, great emphasis being placed upon memorizing and the art of constructing literary mosaics from the Chinese classics. The early Greeks, as is well known, had only two types of training for the children of the higher classes, the physical in the gymnasium, and the literary and musical in the school. All the peoples thus far mentioned used their own religious and literary works as the sole material for instruction in speech. The Romans, who borrowed the civilization of the Greeks, found it advisable or perhaps necessary to take the Greek language with Greek culture. At any rate, they appear to be the first people who utilized a foreign language in educating their youth.

Discussion: — Extent to which the modern man still needs to have his literary education based on sacred writings.

Historically considered the linguistic or technical side of language instruction has always embraced, though

with varying degrees of emphasis, the three elements, grammar, rhetoric, and dialectics. The modern schoolman is not a little astonished to find how much weight has in the past been ascribed to these aspects of literary study in the training of youth. Their end and aim has always been the *mastery of the word;* with the Greek, for the adornment of life; with the Roman, primarily for oratorical, and secondarily for literary finish and efficiency; with the early Christians, for the purity, fulness, and convincing force of the sermon; with the middle ages the trivium (grammar, rhetoric, and dialectic), for perfection in the art of defining, distinguishing, proving, debating, and systematizing; with the leaders of the renaissance, for the development of an eloquence that should rival that of the best days of Greece and Rome. With all these peoples the formal mastery of the word was the very life-blood of culture, the necessary prolegomena to excellence in the domain of language and of everything to which literary excellence is the vestibule. Classical philology in modern times has different aims. Its chief undertaking is the ideal reconstruction of the entire life of a people, cultural and institutional. The writings of such a people constitute the original sources of information, and the study of their language furnishes the key to the treasures. Both the sources and the speech become, therefore, objects of research to the modern philologist. To summon the spirit of a departed age, she must cry, — " Speak that I may see

you."[1] But if in modern educational circles linguistic instruction assumes a more restricted, it has still a most important, function.

Discussion: — Extent to which the old reasons for the *mastery of the word* are still valid.

The more a given group of studies is urged as a necessity in education, the more imperative becomes the need of determining its inherent worth, lest the traditional estimate of its value be over or under rated. We need, therefore, to perceive clearly the nature and content of such studies, that we may justly estimate their permanent importance.

To the modern high school, grammar is far more important than rhetoric or dialectics, since, first, it is indispensable for comprehending and using a foreign language, and second, because dialectic, or logic, is now remanded to higher education, while rhetoric is confined mostly to the mother-tongue, the effort to compose artistically in foreign tongues being now abandoned. The first great question, then, concerning the value of literary study is: what are the functions, what the limitations of grammar as an instrument for the training of youth?

Grammar in itself is nothing more than a systematic exposition of the forms which speech assumes in endeavoring to mirror with exactness the mental processes

[1] Compare Willmann, "Didaktik," Vol. I, pp. 392–393.

in which language originates. Grammar applies alike to the commonplace and to the exalted, yet it partakes of the characteristics of neither the one nor the other; it inquires merely: (1) What aspects of thought does a given grammatical inflection or construction represent, and (2) What grammatical forms must be observed to express a given aspect of thought? In other words, as already stated, grammar is used both as a key to the understanding of thought, and as a guide to its adequate expression. It is like the natural sciences in that it takes an outer object, a word or a sentence, for observation and reflection; but it is unlike those sciences in that it always has an inner reference. The symbol is external, but the thing signified is internal, for it has to do with the thinking itself, and not only the thing thought about. This makes grammatical study a concrete sort of introspection, the vestibule to psychology and logic. Here for the first time in school study the student begins to think about his thinking, *i.e.*, about the adaptation of word and sentence form to the meaning they would express.

Negatively considered, since grammar is purely formal and is consequently independent of the content of the language to which it applies, we must conclude that there are many functions of science and literature that grammar does not perform. For illustration, it does not have the apodictic certainty of mathematics, for its rules and forms are subject to exceptions; the quality of mem-

ory demanded in grammar is different from that required in physics or mathematics, for it is the exceptions rather than the rules that are hard to remember in grammar; it furnishes no food to the imagination, however much it may incite to guessing, and is consequently lacking in all æsthetic quality; the emotions it leaves quite untouched except the painful ones incident to its perplexities; in itself considered as a system of categories it is as unemotional as mathematics itself, for it touches not at all the will of man, the weal or woe of race, country, or condition; it is indifferent alike to hope and despair, to love and hate, to good and evil, to the beautiful and to the ugly.

Positively considered, grammar is a pure intellectual discipline, but differs nevertheless essentially from other studies seemingly like it in intellectual quality. As above observed, it has two main purposes and one peculiarity. Its first purpose is to serve as an aid to the comprehension of what is written, especially what is written in a foreign tongue; its second purpose is to aid in using language correctly. In the mother-tongue these two aspects of grammar are somewhat equally emphasized, for as the mother-tongue is easy to understand, so up to a certain point it is easy to use. But with foreign languages both aspects of grammar become more important, for a foreign tongue is difficult for the beginner to understand, and greatly more difficult to use. For this reason composition in a foreign

language makes the second function of grammar particularly important.

The peculiarity of grammar as an intellectual discipline is that it turns the mind inward to observe the characteristics of its own thinking. This peculiarity and the exercise of the twofold purpose of grammar demand especial investigation, for in them we shall find the reasons why men consider grammatical training of so much worth to the young.

The importance of the introspective nature of grammatical study lies in the fact that it originates and develops the language consciousness. Primitive language sense is developed in the mother-tongue by intercourse with parents and companions, but language consciousness comes only when the mind begins to examine by inner reference, first the thoughts of others as expressed in speech, and then its own. Think, for example, of the mental training in speech consciousness involved in the study of the manifold ways in which assertions may be made, *i.e.*, in the study of modes. How does one think when one says, Were I not Alexander, I would be Diogenes; *Man sagt, der Koenig sei gestorben; Que voulez-vous que je dise?* What is the difference in the thinking when one uses now an intransitive, now a transitive verb; now an active, now a passive form? What aspect of thought is exhibited in each of the cases of substantives? Think, moreover, of the infinite variety that is given to speech and hence to thought by limiting or quali-

fying words, phrases, and clauses. In the study of foreign languages the mind is thus turned to the analysis of thought, not for a day or a week, but for years, and culminates in a new and higher language sense.[1] Apprehension of distinctions both broad and subtle becomes quick and keen; a sensitive feeling for the fine and noble in language, even if not in life, is engendered; the play of fancy, the flash of wit, the convincing force of logical conclusion, the appeal to sympathy, the resounding call to duty and noble living, all alike find a ready response in a mind thus trained. Such a man acquires the efficiency of the liberated tongue. What he has learned to note in the thought of others, he transfers in kind at least to his own thinking. Here is one great source of the difference, everywhere felt, between the educated and the uneducated man, even though by native endowment they may be equal. The educated man thinks and speaks clearly, definitely, concisely, making distinctions when they should be made, qualifying when qualification is needed; he can express adequately the emotion he feels; he knows what an argument is, and when it is conclusive, concerning any matter with which he is acquainted; and he has an appreciation for the subtle, the artistic, and the refined, which he never could have had had he been linguistically uneducated. In most respects the uneducated man appears the reverse of all this. His thought is general, and guided more by

[1] Compare § 77.

instinct than by trained intellectual force; his feelings are likely to be massive and primitive, and not easily expressed in words; his logical processes are simple in character and quite as likely to be directed by prejudice as reason; while his appreciation of the beautiful and refined is sadly limited by his unfamiliarity with the language by which they are expressed. In these and similar reflections one can perceive some of the reasons why grammar, as the vestibule to introspection, has been and indeed is so highly estimated as a means of mental culture.

DISCUSSION: — 1. Does the educational value of grammar warrant the isolated study of grammar as the first stage of instruction in foreign languages? 2. Distinguish between primitive and cultivated language sense, showing how language consciousness leads to the latter. 3. How can a study in itself unemotional still become a means of emotional control?

Turning now to the twofold aspect which grammar assumes in learning, first to understand language and then to use it, we have to examine the validity of the claim, made since first speech as such was studied, that it furnishes if not a universal, at all events an admirable training in logical thinking.

All the reasoning there is in grammar centres about a few logical relations, and even these need not be explicitly but only implicitly known. The sentence is the expression in words of the form of thought we call the judgment. From the nature of the judgment, the logical relations of

the sentence follow. There must first be the substantive to correspond to the first concept of the judgment, then the attribute to correspond to the second concept of the judgment, and then finally the copula, or the asserting part of a verb, to correspond to the mental act of affirming the second concept to the first, or of excluding it from the first wholly or in part. In this way subject, copula, and attribute arise. Since the attribute may be (1) a word expressing action, state, or being, (2) a quality, (3) a thing or class of things, and since a word expressing action, etc., may be united with the copula, or asserting element, it follows that what we call an attributive verb consists of copula and attribute united in a single word. In other words, the verb in this case performs two offices, that of asserting, and that of showing what is asserted. When, however, the attribute is not verbal, it is separate from the copula as adjective or noun.

Here we have the logical framework of the sentence. Then follow the modifications of the three main elements found in inflection, and modification by word, phrase, or clause, as exhibited in works on grammar. Nouns are distinguished as to person, number, gender, case; they are also classified according to logical categories. Copulas, or asserting elements, are inflected to show manner or mode of assertion, hence the various modes or moods; actions take place in time, hence there must be the idea of tense; actions vary as to cause, time, place, circumstance, etc.,

hence adverbial modification; qualities differ in degree, hence adjectives may also be modified to show this. The name of a modifier showing degree is also called an adverb. Then finally the noun attribute may be modified like any other substantive. Here in outline is the whole circle of thought found in grammar. It takes some maturity, such as is found in the high school, to comprehend the logical relations, but after all the range of thought is very limited and exceedingly simple. A bright student ought to be able to master the whole thing, in principle, in a week or less. If insight into fundamental grammatical relations were all there is to grammatical discipline, we might let our students come in their best clothes, teach them the grammar in the morning and give them a picnic in the afternoon. Mathematics, on the other hand, has to do with quantities and the ratios between them. In the beginning the quantities are more prominent, and the ratios very simple. As the subject develops, the ratios become more complex and the quantities continue to retreat from view, being represented by more and more complex symbols. The subject is therefore one of constantly increasing complexity and abstractness, it being more than possible for the student to lose all sense of concreteness and to juggle merely with symbols. But all that is essential in the thought range of grammar may be written on a single sheet of paper and mastered in a week, while men have not yet found the end in mathematics.

Some years ago one of the ablest of German mathematicians was accustomed to give a course of lectures each year outlining the advances in mathematics; but he gave up the attempt, for he declared that the discoveries in this field proved too great for him to follow. In their measure, the same is true of all the natural sciences. Nobody makes any new discoveries in the closed system of grammar, but thought never ceases in its onward march in science. The excellences of grammar as a mental discipline for the young can then hardly lie in a mastery of the limited thought system involved in technical grammar. In what does it lie?

DISCUSSION: — Compare the possibilities of development of the thought systems involved in grammar and logic with those in mathematics and physical science.

If Panini was able to formulate four thousand rules for Sanscrit, it must have been because the exceptions were treated as rules. Modern grammar, however, has comparatively few rules and many exceptions. It is in the use of rules and exceptions that the peculiar logical discipline of grammar consists. Every sentence is an illustration of fundamental rules, and may be of exceptions. When the student has to work up to his ability in translation, he finds constant application of his grammatical knowledge of both. A glance at the ending of a word may inform him whether it is a noun or a verb, and if a noun

whether it is subject or object, genitive or dative. On the other hand, the form may not in itself show the true construction, when further tests must be applied. Fleeting hypotheses may be formed, to be approved or rejected by a new test, until the student is satisfied that he sees the meaning of the sentence. Then by a reverse process, he can quickly verify his first impressions, and discover if any word or form is still unaccounted for or has been incorrectly apprehended. In composition, say in a foreign tongue, the same process is involved, but in still more accentuated form, for it is easier to use one's grammatical knowledge effectively in translation than in composition. Needless to say, perhaps, the use of grammar in understanding or in composing in the mother-tongue is confined to those difficult points that demand the exercise of language consciousness. For the most part, the language sense developed since infancy suffices for the grammatical side of both understanding and composition. English grammar is consequently studied by American high-school students mostly for the mastery of the thought system involved and only secondarily for understanding and guidance in use. In the case of those whose language sense has been perverted by long practice of incorrect speech, grammar in the mother-tongue performs much the same functions as in the study and use of foreign language.

The thought in grammar is not the long, vigorous, unbroken chain so essential in mathematics; it is not con-

tinuous in length and breadth like that in natural science; it involves little of the mental persistence and plodding industry needed in mathematics and other exact sciences. On the other hand it is characterized by flexibility, alertness, and all-sidedness of insight and remembrance. Instead of having the longitudinal or chainlike form of exact science, it is, so to speak, *radial* in form. The student is incited to think in every direction in rapid succession concerning the inflection of words, their position in the sentence, the rules of syntax, and, above all, the exceptions. He must have at ready command the hundreds of forms shown in declensions and conjugations, both regular and irregular, and at equally ready command all the irregularities that adhere to syntactical rules. To be effective, this mass of knowledge, forming a great apperceiving resource, must be at instant command. The study of foreign languages has long been applauded for its training of the memory. One sees here why the claim is well founded as far as it goes. Every sentence examined or written, every word inflected or construed, calls for quick and accurate application of what is known. The student is like a sturdy mountain-climber when he is studying mathematics; but he is more like a skilful fencer when he is using his grammatical knowledge in translating, or is composing in a foreign tongue. In the first case he must march by laborious steps to his goal; in the second he must ward off every false impression and thrust to the

heart of the truth. Through grammatical study then we get, not depth, but versatility; not strength, but alertness; not insight into principle, but retention in memory; not a chain, but a web form of thought; not the onward march of experimental science, but the kaleidoscopic aspect of continuous application of a mass of rules and exceptions to a succession of sentences.

Discussion: — What would be the educational worth of grammar should it remain unapplied to literature: (*a*) in English; (*b*) in foreign languages?

(2) *Literature*

The primary fact about literature, never to be forgotten by its teacher, is that it is one of the fine arts, and like all other fine arts it portrays the ideal through a sense medium, — in this case the word. It differs from history both in content and form, for history undertakes to narrate events, their causes and effects, as they actually occurred, and though at times its form may be what is called 'literary,' this is never regarded as more than accessory; whereas literature makes no attempt to chronicle events. Its truth is psychological and ethical rather than historical, while its form is æsthetic. The mission of history is to inform, to make the experiences of the past a lamp for the future; that of literature is to lift the thoughts of men above the commonplace, to inculcate ideals, to make men at home in the world of emotion, to stimulate them to

higher living. It takes its themes both from the outer and the inner world, striving to give an inner meaning to the outer forms of nature, or to make the inner world of feeling take on the visible aspect of the beautiful in nature, as in the cry of Emilia Galotti, about to suffer an untimely death,

> "Eine Rose gebrochen
> Ehe der Sturm sie entblättert hat."

Works of literature are monuments both to the spiritual life of the people from which they spring, and to the genius of the language in which they are written. It is for this reason that the modern philologist undertakes to reconstruct the whole inner life of nations through a study of their language and the literature in which the language is embodied. Literary and linguistic study, therefore, at the present time is much broader than in the past, when a single aim like oratory, or the imitation of classical style, often engrossed the entire attention of teacher and student.

Literature, whether in foreign languages or in the mother-tongue, embraces many forms, from narration, oratory, proverbs, and lyric verse, up to the drama and the epic, but everywhere we find the characteristics above described: ideals, emotions, aspirations, the noble, the good, the self-sacrificing, the patriotic — all portrayed positively or negatively in æsthetic form. A literary work is great according to the universal importance of the ideal truths it embodies, and the æsthetic quality of their ex-

pression. Some assert that the four great literary bibles of the race are the works of Homer, Dante, Goethe, and Shakespeare.

Such being the content and form of literature, what are its chief educational functions? Even if there were any need of teaching it for such intellectual training as is obtained through mathematics and natural science, it is evident that the nature of the subject is such that an effort to produce like results from literature would necessarily prove abortive, for literature has to do with ideals and emotions and beautiful forms, not with chains of logical thought, or with causes of natural phenomena. Freeman objected to teaching literature as a university subject on the ground that it deals with emotions, which are subjective and personal, and hence not fit topics for examination. One can examine on facts, laws, principles, causes, effects, etc., but how can one examine on states of personal feeling? Such an attempt destroys the feeling itself, leaving only the pale counterfeit which memory may retain. To meet this objection many teachers feed their students on the bare husks, the mere incidental accessories of literature, such as facts of biography, mythological references, etymology of words, syntactical constructions or rhetorical devices for producing effects; others preach ethical sermons, or make elaborate analyses of plot, structure, development, motives, — anything in short, rather than the literature itself. As John Burroughs expresses it,

the class fall upon a literary work as chickens in a barn-yard fall upon a bone, picking it dry. In other words, they teach everything but the literature itself; they attempt to transform a work of art, which is to be understood and appreciated, into a colorless discipline for memory and of cheerless analysis for logical thought.

The remark of Freeman is not a reproach to literature as a high-school subject; it is only a hint as to its true function, which is to portray the ideal as conceived by the author through such beautiful forms as his genius may be able to create. The primary purpose of teaching literature, therefore, must be to lead the student to embody these ideals in his own conduct, to be at home in the world of elevated emotions, to appreciate the truly artistic in literary forms, and in his own little measure to be able to use them in expressing his thoughts. Secondarily there may be other purposes, such as orientation in the inner life of other peoples distant in time or space, or knowledge of the development of literary style in a given field, or indeed of general literary information and polish. Incidental and accessory ends are not to be contemned; they are only to be relegated to their proper position and importance as accessories.

Discussion: — 1. Relative place and importance in the teaching of literature of the elements above named. 2. Was the old idea that each man could read English literature for and by himself educationally sound? 3. What is the justifica-

tion for teaching it, when there are so many other useful subjects that the student *must* study in school if he is ever to have any knowledge of them?

Formerly literature was taught in school only through foreign languages, but the literature of the mother-tongue has now won a place for itself in the high school. That it has often been taught for purposes not native to it, or has received more or less time than its importance demands, is due to its newness as a school discipline, and to the difficulties inherent to its proper presentation. Literature is now in the position that science was forty years ago; namely, that of frequent misconception as to aim and method. But the example of science, which has developed a method in harmony with its purposes, justifies us in believing that a similar development will take place in the teaching of literature.

How far the literature of foreign countries, especially that of the ancient world, should be taught through English translation is a question for the future to decide. On the one hand the period of classical study possible to the American high school is so brief that comparatively little literature can be read in Latin, and still less in Greek, so that if the student who does not go to the university for further study in these subjects is to know much about the real content of classic literatures, he must get that knowledge through English translations. On the other hand, it is urged, first, that translations, however good they may be,

necessarily lack the æsthetic form of the original, and second, that the time used in reading translations is so brief that but slight impression is made upon the student by the content itself. It would be an experiment worth trying for a class to spend six months upon Butcher and Lang's "Iliad" or "Odyssey." In the first place, these translations give the poetic imagery, and lack only the rhythm of the original hexameters, and in the next place such a study would give quite as much time to the content itself as could be given in reading the original, where a large part of the labor of the student is consumed in the effort to discover the meaning of the sentences. American high schools have never really tested the value of English translations of foreign classics, and until they have done so, the question of their value should at least be an open one.

(3) *The Ancient Languages*

The most obvious educational value of the ancient languages is the opportunity they give for the development of language consciousness through the long drill in making grammatical distinctions. The question naturally arises: Why not develop this consciousness through grammatical study of the mother-tongue? In the first place, the study of grammar by itself is nearly valueless for the development of language consciousness, since this depends not upon the mere knowledge that distinctions exist, but upon

long-continued exercise in discerning them in literary works. In the next place, English is not so good as an ancient language for this application, since with the disappearance of inflectional endings, the very distinctions which these exhibit have either disappeared or have become obscure. An instance is the modern disposition to ignore the subjunctive forms of the verb, and consequently the distinctions that these forms imply. Again, the thought content of English, and indeed of modern foreign languages, lies so near, and is of so much more apparent worth than the exercise of making fine distinctions, that both teacher and student instinctively turn to the thought and ignore the grammar. Were we content to do as our fathers did two generations ago, and laboriously parse the whole of Milton's "Paradise Lost" or Pope's "Essay on Man," doubtless we could achieve valuable results in the development of speech consciousness. It seems more fitting, however, to get this drill, say upon Latin, where long application of grammatical principles is a necessary part of the mastery of the language itself, and where the perception of thought distinctions is aided by highly inflected forms.

Since both Latin and Greek are candidates for a position in the modern high-school curriculum, and since both may justly claim excellence in developing speech consciousness, a new question arises; namely: Is the language consciousness developed by the one so different from that developed

by the other that we are justified in teaching both to secure this one end? Or is it worth the time and labor involved to learn two sets of symbols for one set of distinctions? Language consciousness thoroughly developed in one ancient language suffices for this type of training, so that the modern effort to exhibit the parallelism of the grammar of languages is justified and deserves much further development. After the grammar of one foreign language is learned thoroughly, the deviations from this type found in other tongues should be noted for their practical rather than their linguistic worth. This consideration has important bearings upon the educational worth of modern foreign language for the high-school student, as will be noted in Section 75.

With respect to the many-sided attention and the mental alertness demanded by composition in a tongue in which the language sense is not a sufficient guide, all languages are much alike, differing only in degree according to the stage of the student's knowledge and the difficulty of the task set by the teacher. Considering the narrow range of this closed system of thinking as seen in Section 66, it would seem as if former educational practice had greatly overworked this form of mental training. Here if anywhere in education the economic law of diminishing returns certainly holds.

Discussion: — Limits of profitable study of grammar in foreign language, from the standpoint of mental discipline.

What is there in the content of ancient languages that makes them worth teaching to modern students? This question has been discussed, and at times actively debated, for the last four hundred years. The history of education shows how men's estimate of relative educational values has changed with the development of new views of life and the appearance of new subjects for study. We are concerned, however, not with past, but with present estimates of the content values of these studies.

It may be remarked at the beginning that it is not worth while to study these languages for what they contain concerning ancient history or the exposition of ancient military systems or political or social institutions, for since only facts and their causes are sought, all hindrances, such as strange words and constructions merely make it more difficult to learn the facts and to understand the causes. A translation of Aristotle's "Constitution of Athens" gives the reader easy access to an accurate comprehension of a political system, whereas the original would certainly cost more effort without yielding a better result. In the words of Weisenfels: "It is evident that with regard to political and military history, not only a wide, but also a fundamental knowledge can be found through the mother-tongue. The same thing holds with regard to concrete objects and so-called antiquities. In a few hours by instruction through the mother-tongue one can give his students a more exact knowledge and a better understanding of the

aspects of antique life, of geographical and topographical relations, of private and public rights, of the function of officials, changes in the constitution, and everything of this sort, than could be given by a full semester's work with the students upon the ancient writers themselves. The same is true concerning the accomplishments of the ancients in the realms of mathematics, mechanics, and natural sciences in general. Positive knowledge about everything that concerns the outer private, or the official public life of Greeks and Romans can be effectively learned without the aid of the Greek and Latin languages." [1] What is it then that cannot be learned at a smaller price than the mastery of the original text ?

In seeking to answer the foregoing question, it must first be remarked, that in estimating the content value of the ancient languages one can hardly consider high-school instruction in them as an end in itself, for in large measure, especially in Greek, the high-school work is to be considered a mere preparation for continued study in the college or university. In the two years usually given to Greek in our secondary schools, the instruction is necessarily confined mostly to the linguistic side of the language, to the acquisition of a vocabulary, and to learning to read. Not until after he leaves the high school can the student hope to profit by literary training in the Greek tongue. The case is better with Latin, for after the 'Lessons' and

[1] "Handbuch für Lehrer Höherer Schulen," pp. 243–244.

Cæsar are out of the way, even the high-school student may come to genuine Latin literature in Cicero and Virgil.

That colleges and universities demand Latin and sometimes Greek as an entrance requirement to arts or other courses is a good reason for teaching them to students who are preparing for those courses, but since the fact that these requirements are made is only remotely connected with the inherent worth of Latin and Greek, it needs no further elucidation here.

Discussion: — Should high-school instruction in Latin, and in Greek, be considered a whole in itself, or a preparation for future college work? If the former, what changes are needed?[1]

First of all, when one tries to show the educational worth of the content of ancient languages, one needs to

[1] The following from the report of Doctor Dunker, to be found in the Reports of the Royal Prussian Industrial Commission of 1904, published by the United States Bureau of Education, gives the impressions of a distinguished foreigner concerning our short courses in Latin: "In the preparation for practical life, the belief in the cultural value of Latin plays a much greater part than with us. Formerly it was the knowledge of this language that distinguished the literary man from the workman, and, with the tenacity of the parvenu in culture, many an American adheres to this idea. With the briskness peculiar to him he studies for a year, in four weekly lessons, the severe, difficult language of Rome, which demands years of devoted work. The idea is still quite prevalent that it argues extension of culture to be able to recognize a number of Latin roots in the Romanic past of the English vocabulary. The proud inscription, 'Per Pacem ad Libertas,' in one of the principal rooms of the Philippine exhibit at St. Louis, indicates the outcome of such classical culture."

examine two things: (1) the inherent worth of ancient civilization for the modern student, and (2) the extent to which the ancient view of the world, its thought, feeling, genius, and spirit, are inseparably united to their language. If it can be made out that these things are not worth studying, or that they can be just as well comprehended through the mother-tongue, then all those reasons for teaching the ancient languages that pertain to their content value fall away, and only the linguistic reasons for teaching them remain.

To one who sees that the modern world has developed from the ancient the causal connection of the two is self-evident, and it is clear that just as we study the earlier stages of plant or animal, so we must study the earlier stages of our present civilization if we would understand it aright. Both our political and our economic life have developed from Rome. To the Roman conception of national unity we have added the Anglo-Saxon conception of local self-government; while to the Roman laws for private property we have added the ideas of coöperation, both of capital and labor, thereby perfecting with the aid of science and invention higher forms of industry than the ancient world ever knew. But the two root ideas, public patriotism and private property, remain unchanged. Again, what does not the modern world owe to Greece in literature and art, in scientific bent of mind and in philosophy? The achievements of this ancient people are not mere objects of specu-

lative wonder, but they form the very life-blood of modern thinking and artistic creation. To students of the development of civilization, the indebtedness of the modern to the ancient world is so self-evident as to need no demonstration.

It being granted then that the products of antique culture are still worth studying, we have next to examine the claim that the true essence of this culture can be obtained only through a study of the languages in which they are embodied. This claim is not so self-evident, and indeed so difficult is it to prove, that even classicists themselves are sometimes disposed to ignore logical grounds and to make a religion of classical study, claiming for it the emanation of "an indefinable somewhat," which is the true essence of classical culture. The weakness of this position is that nobody but the worshipper himself is impressed by it.

The case, however, is not so bad as to need such desperate remedies. To the philologist, who says to an ancient people, "Speak that I may see you," it has become an axiom that the language of a nation is the mirror of its inner life; for what is language but the expression of what is deepest in the intellectual, moral, and æsthetic life of the people who use it? Even in these modern days of international commerce of goods and thoughts, the same thing is essentially true, as seen in English, Germanic, and Romance languages; how much more true then must it be of a language that is the expression of a closed

system of national life ! This inner spirit expresses itself not only through inflectional endings and sentence structure, showing wide-reaching distinctions as well as subtle shades of thought, but especially also in the artistic forms of lyric, dramatic, and epic verse. To miss these linguistic forms and artistic refinements when studying the content of ancient civilizations, is to contemplate a body from which the life-giving spirit has departed. By means of this immediate contact of the youthful mind with that which is eternally young in the thought and emotion of the race, the youth is able to clear up his inner world, and to protect himself against the conventionalities that compass him about. Here he is able to feel the full pulse of that ancient world which, though now pronounced old, is still ever young, in that he penetrates deeply into the idioms, the linguistic refinements, and the artistic perfections of the ancient literary masterpieces. With the Roman he feels the force of death-defying love of country, the need of political unity, the sacredness of private right and public duty; with the Greek he feels the force of beautiful creations, the musical accord of body and soul, the force of accurate thinking and philosophic comprehension. If, unlike the Greek, he accords these insights, efficiencies, and aspirations to all men according to the measure of their ability, opportunity, and ambition and not only to the few alone who are called the free, why then these mental treasures grow rich as they become universal.

DISCUSSION: — 1. Value of ancient languages as products of ancient civilizations. 2. What classes of students should be advised to study Latin? Greek?

The ancient languages have other educational values more specific than those mentioned above. The English language is particularly rich in Latin roots, while the nomenclature of science is largely derived from the Greek. For this reason both languages are of importance in the study of English etymology.

To the specialist in philology, archæology, or in literature, perhaps also in history and philosophy, they are a necessity, since they form the sources whence all real enlightenment comes. The cry of modern scholarship is always, *Back to Sources.* Indeed, it may be declared, once for all, that to the scholar as specialist these languages are the necessary tools for his investigations, since without them he is like a man in a fog, having to feel his way.

Many other claims more or less well founded have been made for the study of ancient languages, and many eloquent words have been uttered on their behalf. Thus, Goethe says that a man who knows no foreign language cannot adequately know his own; the saying, "one has as many souls as one understands languages," is attributed to King Theodoric and also to Emperor Charles the Fifth; to Von Humboldt is ascribed the assertion that there lies in every language a specific view of the world and that the student gets a new view for every foreign language he

learns; Fichte said, "The language treasure of the scientific world lies in the ancient tongues;" a modern work on Thomas Aquinas declares, "The church everywhere takes with it the Latin language and the dogma developed after the thought forms of the Greeks, so that Greek wisdom and Roman power follow her, however far she may wander through the centuries; so likewise do the sons of the proud Brahmins on the Ganges learn Latin and study the Aristotelian philosophy, as hundreds of years ago the sons of Franks and Saxons began to exercise themselves in Latin speech and Aristotelian dialectic."

One need not rely on the voices of the past, however, for one's estimates of the value of these old subjects, for they assume new aspects with every generation. Each period must examine them anew. The modern teacher can easily fortify himself with facts and reasons applicable to his time, by examining their linguistic function and the comparative worth of their æsthetic and ethical content.

Discussion: — Relative validity of the foregoing claims.

(4) *The Modern Foreign Languages*

French and German, the modern foreign languages most taught in American high schools, may to a certain extent perform the same functions in education that the ancient languages do. Their position, however, as living languages, renders them less fit than the ancient tongues for some purposes, and more fit for others. It is

generally declared on the one hand and conceded on the other that French and German are not so well adapted to give thoroughgoing linguistic training as are Latin and Greek. The reasons are not far to seek. In the first place, they are less highly inflected, so that thought distinctions are not so perfectly mirrored in grammatical forms. In the next place, it is much easier to gain a reading knowledge of modern than of ancient languages, and the student therefore more quickly comes to the point where the content is of much more subjective value than the form. In addition to these inherent reasons, we have the additional consideration, that such linguistic training, even were it possible, is not desirable where there has been thorough grammatical training in an ancient language. On the grounds, therefore, that good linguistic discipline can be more effectively obtained elsewhere, and that when Latin has been well taught, further discipline of this kind is not so desirable as other things, we may fairly come to the conclusion that the earlier attempt to teach French and German in the same way and from the same motives that Latin and Greek are taught should now be abandoned.

If, however, French and German do not easily yield the grammatical training of the older languages, they have certain advantages that give them an especial educational value. As living speech they are capable of furnishing to ear and tongue a training that is comparable to that furnished to the eye by Latin and Greek. They have, more-

over, a vast body of literature that has sprung, not from heathen, but from Christian sources, and which mirrors life as it is, and not as it was. In addition to these strictly educational values, they have also great worth as instruments of research and communication.

It is the good fortune of English-speaking peoples that both French and German are philologically closely related to the mother-tongue, and hence comparatively easy to acquire. The basis of English is Anglo-Saxon, while a large part of its subsequent acquisition is Norman-French. The latter fact explains also why at least the beginnings of a Latin vocabulary are so readily acquired by those whose mother-tongue is English. Considering, then, the inadequacy of French and German to furnish the best grammatical training, and their superiority as to practical utility and literary wealth, how shall we realize most fully their value for modern education?

The new European reform movement for the teaching of modern foreign languages embraces the following main features: —

1. There must be a free and accurate enunciation of elementary sounds, a ready and correct pronunciation of words, fluency in reading, and correctness of intonation. The basis for this training of ear and voice lies in comparative phonetics, as exhibited in the Vietor system.

2. Grammatical knowledge of a modern foreign language is to be limited to what is strictly necessary to an

understanding and use of it, and must never be separated from the living content. The basis for this linguistic mastery lies in an inductive grammatical study of what is read.

3. Students shall be trained to a ready and accurate use of the language as fast as they learn it. The achievements of Director Walter and his colleagues of the Reform Gymnasium at Frankfort a. M. in training students to use the words they learn are worthy of study by American teachers of modern foreign languages.[1] Training in writing and speaking a modern foreign language shall not cease until the student possesses, not only a language consciousness for the new tongue, but also a language sense, which forms an instinctive guide to correct usage. For example, the American student of German shall be able to use the correct gender of nouns without having to reflect upon the matter.

4. Through the study of literary masterpieces, the student shall gain a comprehensive view of the national culture, past and present, of the people whose language he studies; also familiarity with their modes of life and thought. In other words he shall be able to think, feel, and, if desirable, act as a German or a Frenchman would.

How much room for future achievements these ideals open to American teachers of French and German can be inferred from an inspection of our present accomplishments in this field.

[1] See J. E. Russell, "German Higher Schools," pp. 266-290.

Discussion: — 1. Attempts of Comenius to associate Latin words directly with ideas. 2. The Berlitz and other conversational methods. 3. The graphophone as a language-teaching instrument. 4. Should American instruction in French and German aim to develop the power simply to read, or should it also train pupils to compose and to converse? 5. Compare American with foreign literary and industrial conditions.

(5) *The Mother-Tongue*

The Greeks appear to have been the only European people who were able to educate their children without deeming it necessary to teach foreign languages. Some may think that having the best language for their mother-tongue, they naturally needed no other; while others might take the ground that all valuable knowledge was better exhibited in Greek than in any other language. At any rate in the early days, before the rise of philosophy, they were content with the literary treasures of Homer, while later they added the linguistic training devised by the Sophists. It would at least be an interesting experiment to see what an American high school with good teachers could accomplish with a curriculum without foreign languages, and with as much time given to English as is now devoted to the combined study of English and foreign tongues.

The modern scholar in Germany stands in sharp contrast to the ancient Greek. If the Greek confined all linguistic and literary training to his mother-tongue, the German has devoted so much attention to foreign lan-

guages that he has paralyzed his power to use his own, at least in public speech. The following sketch from Lyon [1] shows the result and then the cause: "Whoever contemplates the history of our parliamentary oratory is astonished at the helplessness with which at the beginning the language-trained German appeared in public. It was only gradually that he attained the command of free oral speech, and even to-day good speakers, those who have a really good style, are a rarity in Germany. Many of them tremble even yet when they are to speak in public, and the most of them lose themselves in helpless windings or in whole series of meaningless sentences and repetitions. All this is to be explained by lack of practice and consequent embarrassment. It is precisely the representatives of our highest culture who show this weakness most. What most prevents our German public speakers from having a happy fluency of oral speech is the fear of making mistakes, with which fear our youth are thoroughly inoculated, since in our schools correctness of speech in German and foreign languages takes precedence over everything else. Prince Bismarck, however, almost never used smooth sentences and faultless constructions, yet his speech came like molten metal, clear and penetrating and overpowering through the forceful structure of the whole."

[1] "Der deutsche Unterricht," in "Handbuch für Höherer Schulen," p. 197.

Since 1890 when the German Kaiser declared that the German gymnasiums lacked a national basis, and that for the future they must be more concerned with educating young Germans than young Greeks and Romans, additional attention has been paid to instruction in the German language. Countless monographs, elaborate text-books, and now even a colossal "Handbuch,"[1] are devoted to the subject. Similar movements are now in progress in other European countries.

Discussion: — 1. Educational merits and defects of a secondary education without foreign languages. 2. Other influences in the study of foreign languages that tend to impair the facile use of the mother-tongue. 3. What aspects promote facility in use?

Modern schoolmen have ceased to have doubts as to the adequacy and necessity of the mother-tongue as the great instrument of science, of commerce, of culture, of political and social life, and of daily communication both oral and written. The questions which divide them are: (1) Do we need any specific instruction in the vernacular, which is of necessity the primary presupposition of all acquisition and expression of thought? Is not the native tongue the natural inspiration and expiration of the soul? Why teach English to English-speaking students any more than we teach breathing? (2) Can the mother-tongue be

[1] Matthias, "Handbuch des deutschen Unterrichts an höheren Schulen."

made an effective instrument of linguistic and literary training? Does it not lack inflection? What can take the place of translation as an ever present means of inciting the youth to linguistic effort and of furnishing him with an exhaustless method of discovering and solving linguistic problems? Is not the translation of Latin and Greek texts the best possible training in composition? Do not the reading and appreciation of literature in English come of themselves when a student is admitted to the library? Like reading with Dogberry, do they not come by nature? Why try to teach them?

It has been shown above that the ancient languages are of great and presumably of permanent importance in the development of what is called *language consciousness*, but we must also at once admit that this theoretical insight into the intricacies of speech no longer, in the case of the foreign languages, passes over into that stage which we call *language sense*, whereby one instinctively uses the language correctly for oral and written communication. Since Erasmus few have been able to use Latin like a mother-tongue. Furthermore, no study of ancient languages appears to enable the student to transmute the *language consciousness* derived from them into a complete language sense in the mother-tongue, unless perhaps in the matters of diction and of insight into distinctions of thought. Translation, which must perforce follow the sentence if not the word order of the original, may indeed enrich the diction

and sharpen the wits, but how can it be depended upon as the sole means for producing a fluent, untrammelled flow of original thought in the mother-tongue? Without this free flow, as from a fountain, a genuine, far-reaching language sense for English can hardly be said to exist.

The chief function, then, of English as an object of special study in the high school must be conceived to be transmuting the language sense which our birthright gives us into a higher language sense by means of the language consciousness developed mostly through foreign tongues, but also in a measure through the study of English itself. The cycle is as follows: (1) the immediate language sense inhering in the vernacular; (2) the language consciousness obtained through linguistic study of English and foreign languages; (3) the resulting scientific and literary language sense, which is one of the noblest possessions of the educated man.

That this crowning achievement can never be completely attained without a direct study of the vernacular itself is the prevailing conviction, not only of English-speaking, but also of other modern culture nations. To the first question, then, Do we need instruction in the mother-tongue? the answer must be an emphatic *yes*. To the second question, Can the mother-tongue be made an effective instrument for creating the higher language sense? the answer is, it has already been made such an

instrument to a degree that warrants further efforts at development.

If science was able in forty years to perfect for itself a method that places it on a plane with the best that the humanities can exhibit, why should not the teaching of the vernacular be capable of similar didactic development? The English teacher is in the happy position of the early American who saw before him a continent to develop. If Chatham could then exclaim, "Were I not an Englishman, I would be an American," so can the teacher of ancient languages likewise exclaim, "Were I not a teacher of the old, I would be a teacher of the new."

Concerning the need of teaching English literature in the high school there can likewise be no serious question. That it is perhaps the richest literature of all times is claimed by Anglo-Saxons and often admitted by the scholars of other nations. As such it is worthy of attention in the school. If the Greek could find almost his whole intellectual and ethical training in a far less developed literary treasure, surely we can find enough such training in one that is far greater, richer, and more diversified to warrant us in devoting the necessary time and labor to this end. It is too early to know whether this school instruction in literary masterpieces will materially aid in producing literary masters; but of this we may be assured, it will help to produce a vast body of appreciative readers for the masterpieces that have been or

may be produced. It will appreciably raise the literary standards of our people, and conduce to the development of that unalloyed happiness that comes from communing with the ablest and purest minds the world produces.

Discussion: — 1. In what ways does the study of foreign languages promote the higher language sense in the English? 2. Analyze into its prominent features the best English instruction observed in secondary schools.

GROUP V. THE FINE ARTS

The fine arts are architecture, sculpture, painting, music, and poetry. In the high school they are represented mostly by drawing, singing, and literature, and to a certain extent by moulding, designing, elocution, and rhetoric.

Having in view the fact that the technical element of art is more prominent than the intellectual mastery of its fundamental ideas, or the æsthetic appreciation of its merits, German writers on education often regard drawing and singing as mere techniques (*Fertigkeiten*), and attach them to the course of study as desirable appendices. Such a disposition of the fine arts not only belittles their importance in education, but also obscures the organic nature of the curriculum. No study is worth much in education without its technique, and conversely no technique is worth much that is not grounded in insight, that is, in intellectual mastery and æsthetic, ethi-

cal, or other form of appreciation. The two elements, insight and technique, however, vary greatly in their character and relative emphasis.[1]

Art has two elements, one of content and one of expression, and might be defined as a means of revealing the ideal through a sense medium. The content of art is therefore of an intellectual or conceptual nature, while its material means of expression (stone, brick, wood, bronze, marble, color, tone, word) appear in the three forms of regularity, symmetry, and harmony. The ideal, or conceptual element may rise from the simplest to the most exalted theme, as from Goethe's violet crushed by the foot of the careless maid to the greatest conceptions of classic and religious art as seen in the Apollo Belvedere or the Sistine Madonna. The sensuous element may likewise range from the simple rhythm of monotonous repetition to the perfect harmony of diverse elements as seen in the Parthenon, the Winged Victory, the Last Judgment, a Beethoven symphony, or a tragedy by Homer, Goethe, or Shakespeare.

Æsthetics as a department of philosophy undertakes to explain the fundamental conceptions of art, and to show why the various combinations of the sensuous elements please and elevate the mind. Even an elementary study of æsthetics will greatly aid the teacher in enabling him to cultivate in his students an appreciation of art.

[1] Compare Section 88.

One of the most important of the many treatises upon æsthetics is that by Hegel, of which Dr. Wm. T. Harris has given a concrete outline in his "Psychologic Foundations of Education." A more modern work of much value to the teacher is William Knight's "Philosophy of the Beautiful."

As Dr. Harris says, "The three highest activities of the soul deal with the beautiful, the good, and the true." Science in the broad sense reveals the true; ethics and religion deal with the good, while æsthetics deals with the beautiful. To the high-school student, however, the beautiful appears not as abstract theory, but as concrete art. If he is to have his powers of appreciation and his skill in execution developed, it must be through contemplation of works of art and practice in representing them, chiefly through drawing on the one hand, and singing on the other. The æsthetic importance of the study of literature has already been considered, so that what remains is to show in outline the specific educational functions of drawing and singing.

Discussion: — Compare Hegel's "Philosophy of Art," as seen in Dr. Harris's "Psychologic Foundations," with the origins of art as exhibited by such writers as Spencer, Grosse, and Hirn, as a guide to the teaching of art.

The first and most obvious function of these arts is to enhance the student's powers of æsthetic apprecia-

tion for the forms of art involved in drawing and singing, since these exercises give an insight into the laws of regularity, symmetry, and harmony as elements of expression that can be obtained so effectively in no other way. The exercise of these arts, moreover, helps to develop the mind's latent power of appreciation of what is most satisfying in the ideals of art.

In addition to this general function of these high-school forms of art study, each has important specific functions. Drawing trains the eye and the hand, whereas singing trains the ear and the vocal organs.

A new sort and quality of observation is demanded the moment the student tries to represent objects by the aid of the pencil, for not only must he see precisely all the details of form, but he must look at the world as if it were flat, and yet must at the same time see how its depth can be represented by shade and perspective. When one considers for a moment the enormous importance of sight in the formation of our mental images, one can perceive the educational significance of such a systematic training in exactness of vision as is involved in drawing. Nor is the value of this training limited to the æsthetic field, but extends into almost every department of practical life, finding its applications in all the natural and most of the humanistic sciences, as seen in the designing of machines, in manual, decorative, and other useful arts. In all of these, the sure eye and the skilful hand, so highly

prized by Rousseau, find unlimited scope. Drawing, therefore, in high-school education has three educational functions not fulfilled by any other department of study: (1) It contributes to æsthetic appreciation the element that comes alone through efforts to construct the æsthetic forms of space; (2) it compels a kind and keenness of observation not found elsewhere, in that it combines exactness of detail in observation of tri-dimensional objects with their representation in two-dimensional space; and (3) it makes the hand skilful, not only in a fine art, but also in many useful arts.

Modern nations have become aware of the fact that art instruction in the schools has immediate and important relations to industry. England learned this at her first world exposition in 1851, and the American public became increasingly aware of it in 1876 at Philadelphia and again at Chicago in 1893. To cite an instance, — Sweden and Norway, the inventors of wood sloyd, were so inartistic in their productions that in 1881 they were able to export to the United States but $137 worth of manufactured wooden articles, whereas Belgium, a nation having the artistic qualities of the French, sent $118,146 of this class of goods, *i.e.*, nearly one thousand times as much. Other causes may have entered into this result, which, however, is so startling as to be instructive.

"In 1851, at the World's Exposition in London, it became evident that English industries were not of such

a character as to compete with those of France and Belgium. Prince Albert, wise and thoughtful as he was, set about a deep-reaching system of education that should correct the national defect and recover the prestige of British arts and manufactures. The South Kensington Museum was established, and day and evening art schools set up in all manufacturing centres. The museum placed at its foundation a collection of works of art showing the history of art — its beginnings, its high-water marks, and its fluctuations. On this basis instruction was given in those forms of ornamentation that the world has pronounced beautiful. There began from this time a gradual rise in the taste of the English workman; from being an artisan pure and simple he began to be an artist. England has gone forward rapidly in the direction of producing works of taste, and her useful manufactures, heretofore made without reference to beauty, have improved in tastefulness of design and execution.

"The establishment of a great national art gallery, the Louvre, and the studies of French savants in the canons of good taste had long before revolutionized French manufactures and given France the supremacy in the world market for goods that command high prices and ready sale.

"Taking hint from England, we have had in this country something of the fever for education in art, especially in the lines of industrial drawing. Remarkable as has

been our progress in the matter, yet there is a prevalent lack of insight into the true direction and significance of this branch of industrial drawing. We have had much stress laid on geometric drawing and the construction of working drawings, as well as the old-fashioned system of drawing pictures of objects, and we have had much invention of original designs, founded on the basis of regularity and symmetry, but we have had very little of a really high order of æsthetics." [1]

Singing trains the ear in the perception of tone and rhythm and to the sure distinction of musical intervals, while at the same time it develops the vocal organs and contributes materially to correct breathing. It is through singing that the student gets his first clear insight into the nature of vowels and consonants, in that he finds the vowels can be prolonged while the consonants as a rule cannot. The breathing exercises possibly help the student to acquire a feeling for the correct construction of sentences, as he must take breath at the right places. This again aids in good declamation, while the developed sense of rhythm and time contribute to an appreciation of the same elements in poetry. Singing, then, has also three great educational functions not adequately performed by other subjects: (1) It contributes essentially to the appreciation of those forms of art that

[1] Wm. T. Harris, "Art Education the True Industrial Education," Report National Commissioner of Education, 1904, pp. 1134–1135.

find their expression in *time*, primarily music and secondarily poetry; (2) it trains the ear to nice discriminations in sound and rhythm; and (3) it develops the vocal organs. In these ways singing contributes to the perfection of one of the purest and most gratifying accomplishments known to man, that of vocal song.

DISCUSSION: — 1. Extent to which music should be taught to the unmusical and drawing to those inapt with the pencil. 2. Compare free-hand with mechanical drawing as to artistic value and practical effectiveness. 3. In what respects may the scientific imagination be deemed æsthetic?

GROUP VI. HISTORY

Fundamentally, history is the story of man and all that favors or hinders his progress in well-being — the influences of his environment whether natural or human that have affected him, the responses he has made to the stimuli of this environment, the institutions he has devised to fix and transmit his advances; in short, the whole account of his efforts, mishaps, failures, and successes as a social being.

The leading theme of history, however, is political progress; the rise, growth, and development of states, nations, empires; their collisions, conquests, and alliances, all to one great and often unconscious end; namely, the progress of the individual in civil rights and duties, his development toward freedom and self-government. To the

astonished eye of youth, history portrays the superlatively great in human affairs; great battles, the clash of empires, supreme national exertions and sacrifices, all-compassing patriotism and self-sacrifice on the part of the leaders of society, towering ambitions, overpowering military genius, and epoch-making initiative on the part of statesmen and warriors. It is in history that the young first learn to regard the present as the last attained stage of a mighty evolution, and thereby acquire reverence for the vicarious sacrifices of the past, regard for the civil liberties of the present, and a sense of responsibility for the civil welfare of coming generations.

Discussion: — Should history be regarded as a generalizing science like economics, or as one that merely traces specific effects to their specific sources? See Publications of the American Economic Association, Third Series, No. 2, pp. 137–199.

Besides influencing and even forming the student's permanent attitude of mind regarding civil rights, duties and responsibilities, history performs a number of intellectual and ethical functions that are largely peculiar to itself, the most important of which may be mentioned.

1. History is preëminently the realm of the contingent, that is, of a class of causes and effects which, unlike those revealed by natural science, do not follow the invariable order of natural law, but are influenced and sometimes determined by circumstances that might have been other-

wise. This does not mean that no law can be observed among these phenomena, for that would not be true. Yet these laws lack the apodictic certainty of those realms of science with which the will of man has nothing to do. For illustration, the result of battle often depends not upon numbers and equipments alone, but upon accidents of field and flood, the unforeseen presence of natural obstacles, like the sunken road at Waterloo, the freshness or weariness of the troops, their flood and ebb of courage, the genius, stupidity, jealousy, caprice, intelligence, or information of the officers. The mental attitude of a people is generally influenced if not determined by their economic situation; often by prejudices engendered by the quarrels, sometimes personal, of party leaders, and not seldom in the past by differences in religious opinion and practices, whereby men not unfrequently lost their natural reason. In short, historical results are a resultant of forces both natural and human, wherein the accidents of the one and the defects of the other play their part. If it is insisted that these causes are still "natural," and the results inevitable, then it must be urged that these causes are often indeterminable, so that both causes and effects are nevertheless contingent.

From the contingent nature of historical causes arises the first great function of historical training; namely, the development of judgment respecting the civil affairs of men. This judgment enables its possessor duly to weigh

the motives, preconceptions, prejudices, and capacities both of individuals and communities; it enables him to estimate the probable effects of deviation from fundamental principles, to forecast the transforming force of new conditions of political life, like the influence of trusts and labor unions, or property and intelligence qualifications for suffrage; it shows how dependent political opinion is upon birth, geographical location, and supposed economic advantage. The satirist sometimes declares that when the rains fail along the western border of the Mississippi basin, the farmers let their hair grow long and start a new political party. If on the one hand, however, the historical student is inclined to condemn the weakness and inconsequence of political opinions, he may on the other easily satisfy himself of how true and faithful even unto death the people are when the great seer reveals to them in unmistakable terms their sacred rights and their more sacred duties.

2. Next in importance to training in sound political judgment, and growing out of the contingent nature of historical causes, is the spirit of toleration thereby engendered. He who reasons mathematically concerning the right or wrong of historical actions is necessarily intolerant, for mathematics has no place for caprice, interest, personal bias, or the influence of birth or party affiliation. But historical judgment can take note of these and other contingent causes and can enable the

judge to put himself in the other man's place, to see with his eyes, feel with his heart, and act with his decision and energy in the same way he acted. When men are in the midst of heated conflicts, either of arms or ideas, they are prone to forget toleration and sound political judgment. It is history, which views events after the fires of partisanship are dead, that enables men to recover their lost perspective, to understand aright, and finally, when judgment must be passed upon the moral aspect of any great struggle, to pass it with a full knowledge of all the contingent causes and with a magnanimity of spirit that transforms the partisan into the patriot. It is this spirit that robs defeat of its sting and victory of its exultation over a defeated opponent. History sends the youth into the world disposed to be fair and tolerant toward his fellows whether in party or in national opposition, to be predisposed to free himself from prejudice and unreason, and to regard political differences in the light of all the circumstances. How much unreasoning hatred toward England has in the past been engendered in American youth by the study of history written in the spirit of partisanship and intolerance! Happily that epoch is now past and we are able to view England through the eyes of such historians as John Fiske and Goldwin Smith.

3. History trains the student in the exercise of what may be called the reconstructive imagination, in that it

calls upon him to picture outgrown modes of thought and feeling, to construct images of old social customs, to imagine the influence of an economic, political, and social life almost totally different from that of the present. Reasoning always upon the basis of this image of old conditions the student is called upon to reconstruct the whole social consciousness of the people whom he is studying. He must be able to see, feel, and act with them, thus making himself for the time being a new personality. Assuming that the youth who thus reconstructs the past will want to imagine himself one of the leaders, he will be now an Egyptian priest or soldier; now a Greek freeman, landowner and noble, if not a philosopher; now a feudal lord or a mediæval church dignitary; or in modern times a Drake, a Napoleon, or a merchant prince. The play of fantasy involved in this change of personality gives great flexibility to the imagination of youth. It is a legitimate successor to the imagination of the child who is ready to 'play' any rôle his fancy suggests; and it is allied to the form involved in trying to live into the consciousness of a foreign nation through the study of their language. On the other hand, it differs radically from the forms of imagination involved in natural science and geometry, since they are constructive in a different sense.

4. The exercise of the memory in history takes on new forms because of the contingent nature of the causes. It is causal, or rational, to the extent to which events are

remembered through their causes, but the memory for the causes themselves often partakes of the mechanical, since they could not have been foreseen, but must simply be remembered. There is also room for a large amount of purely mechanical memory in this study, as every teacher who has prepared for an examination in history well knows. How to enable the student to secure the most lasting retention for the important events in history is an ever present problem to the teacher.

5. Finally, historical study should materially assist the student to develop his permanent attitude toward political liberty and self-government. If he is a member of a democratic society like our own, he will see not only the lasting good in democracy, but he will also see and in his measure be able to promote the conditions necessary for its successful continuance. With such an insight and disposition as history is able to give him, he will not be shaken by tempests in teapots, will not lose his faith in political freedom because some men remember their privileges and forget their responsibilities, but he will do his share in promoting public intelligence and arousing public conscience, thus like St. Paul, fighting the good fight and keeping the faith.

Discussion: — 1. Which is more effective with high-school students, history treated as a science, or history treated as a literary art? 2. In what sense does history belong to æsthetics?

NOTE. — Mr. Charles Henry Firth in his "Plea for the Historical Teaching of History," London, 1904, says: "Men give opposite answers according to their conception of the methods and objects of the historian. One tells us that history is a science, nothing more and nothing less; another that it is an art and that one only succeeds in it by imagination. To me it seems to lie between these two extremes. History is neither, but it partakes of the nature of both."

C. The Economic Sciences

GROUP VII

(1) *Economics*

Although economics as a science is not yet generally taught in high schools, the economic aspects of secondary education have become so numerous and important as to justify an economic group in the classification of studies.

Whenever society enters distinctively into a new phase of its evolution, there must be a new distribution of educational values. In a hundred years civilized society the world over has changed the whole tone of its existence. If it was once speculative and subjective, it is now scientific and objective; if once it was agricultural and rural, it is now industrial and urban. Speaking of our industrial evolution, Professor Dewey says: "The change that overshadows and even controls all others is the industrial one — the application of science resulting in the great inventions that have utilized the forces of nature on a vast and inexpensive scale; the growth of a world-wide market as the object of production, of vast manufacturing centres to supply this market, of cheap and rapid means

of communication and distribution between all its parts. Even as to its feebler beginnings, this change is not much more than a century old; in many of its most important aspects it falls within the short span of those now living. One can hardly believe there has been a revolution in all history so rapid, so extensive, and so complete."[1]

Fortunately for America, public and educational sentiment had been able to keep within reasonable distance of the stages of this industrial revolution, so that society is ready to utilize its best educational products in this new field, and the schools have been able in some degree at least to prepare the individual to devote his powers successfully to the new needs. Germany is an illustration of a land in which industrial progress has greatly outstripped educational development and social sentiment. The result is an "educated proletariat," to use Prince Bismarck's phrase, or, in other words, overproduction in the world of scholarship. Outside of a few great commercial centres, like Hamburg and Bremen, social sentiment does not permit an educated man to use his talents and learning for the promotion of industry, but dictates that he shall work in a learned profession or a civil office. With increasing industrial prosperity the higher schools and universities double their attendance every few years, while the possible places in official or professional life can but keep pace with the general increase of population. Here

[1] "School and Society," pp. 21–22.

we have an educational application of the famous Malthusian doctrine of the relation between food-supply and population. According to Russell,[1] to secure a permanent appointment as a teacher, a man must wait and work without salary on an average for a period of nearly six years (five or six years) after he has finished his university course. The "Associated Physicians of Germany" announce through the daily press that there are ten applicants for every position open in the medical profession. When it is remembered that not alone social prejudice, but also long years of highly specialized education, prevent a man trained in one field from successfully entering another, one can see how great a hardship it is to be confined to a calling in which the applicants outnumber ten to one the possible openings. Thanks, however, to our democratic sentiment, our readiness to fit our education to the needs of our students, and to the unrivalled opportunities opened to every variety of talent, we hardly know the meaning of the term *overproduction* as applied to educated men.

So imperative is the need of adjusting our education to our new industrial life, that President Eliot attempts a new definition of the cultivated man. In addition to the old concepts of what constitutes the cultivated man, he introduces some elements decidedly modern, as may be inferred from a few extracts from his address:—

[1] "German Higher Schools," p. 373.

"The rising generation should think hard, and feel keenly, just where the men and women who constitute the actual human world are thinking and feeling to-day.

"Combine the knowledge of literature with knowledge of the 'stream of the world,' and you have united two large sources of the influence of the cultivated person.

"Culture can no longer imply a knowledge of everything, not even a little knowledge of everything. It must be content with general knowledge of some things, and a real mastery of some small portion of the human store.

"The imagination is the greatest of human powers, no matter in what field it works — in art or literature, in mechanical invention, in science, government, commerce, or religion; and the training of the imagination is, therefore, far the most important part of education.

"That great century (the nineteenth) has taught us that, on the whole, the scientific imagination is quite as productive for human service as the literary or poetic imagination.

"Let us as teachers accept no single element or kind of culture as the one essential; let us remember that the best fruits of real culture are an open mind, broad sympathies, and respect for all the diverse achievements of the human intellect at whatever stage of development they may actually be — the stage of fresh discovery, or bold exploration, or complete conquest. Let us remember that the moral elements of the new education are individual

choice of studies and career among a great, new variety of studies and careers, early responsibility accompanying this freedom of choice, love of truth now that truth may be directly sought through rational inquiry, and an omnipotent sense of social obligation. Those moral elements are so strong that the new forms of culture are likely to prove themselves quite as productive of morality, high-mindedness, and idealism as the old." [1]

DISCUSSION: — 1. What hinders a rapid readjustment of education to modern conditions? 2. Is a fair degree of educational balance still possible and desirable in secondary education? (See paragraph 3 of President Eliot's definition.)

The theme of economics is the study of society from the standpoint of wealth, or material well-being. First, it investigates theoretically the laws and conditions of wealth production, while practically education in economics endeavors to prepare the citizen for efficient service in such production; this gives rise to manual training and other forms of industrial education. Again, economics investigates theoretically the laws and conditions of wealth exchange, while the school also tries to promote practical efficiency on the part of its students in effecting the exchange; this gives rise to schools and departments of commerce. Finally economics investigates the laws of consumption and the consequent stand-

[1] C. W. Eliot, "A New Definition of the Cultured Man," Proceedings N. E. A., 1903, pp. 46–54.

ard of life among the people, turning its attention to the burning question of the proper relation between the possibilities of earning and the cultural necessities for spending. Even if there is no special department of school education which trains to rational consumption, yet school economics should at least try to impart rational ideals regarding minimum standards of life, and the duty of society to raise them among the masses.

Discussion: — 1. Is it wise to include elementary economics as a distinct study in any high-school course? in which? 2. Value to the teacher of a study of economics.

As explained in Section 30, the studies of the economic group may be regarded as compounds arising from the application of pure sciences to industrial or material welfare. Here we see the exact, the biological, and the earth sciences joining with history, modern foreign languages, anthropology, etc., to lay the foundations of industrial welfare, and to prepare the individual both on the side of insight and upon that of efficiency to play an honorable and useful part therein.

What was said under history as to using the powers of reason, imagination, and memory, upon that which is partly natural law and partly contingency, holds likewise of economics, with this difference: that whereas in history they apply to political evolution, the growth of mankind in civil liberty and self-government, in economics they

apply to the daily industrial life about us. History and economic theory determine political policy. With respect to the combination of the law-accordant and the contingent, the two departments give substantially the same mental training, preparing the man of the world for correct judgment in that realm of human affairs where it is necessary to apply scientific categories, but at the same time to allow for contingencies.

Economics, unlike history, abounds in generalizations, like Ricardo's law of rent, Malthus' law of population, the law of diminishing returns, etc., which are however more or less modified by the contingent. Thus, for example, few people are disturbed at present by the inexorable logic of the Malthusian doctrine, for commerce and invention are increasing food-supply faster than population advances, even with the aid of better economic and hygienic conditions. History searches out the causes immediate and remote for any given series of events, but it hesitates to lay down generalizations as to what will occur in the future. It is unexpected contingency, the unpredictable change of circumstances, that renders vain most attempts to judge the future by the past. Economics has, therefore, an element of educational value not found in history, for it teaches the youth to generalize in a new way, wherein contingency modifies, but does not wholly negate, the formulation of law and principle.

DISCUSSION: — 1. Importance of the economic aspects of studies as a preparation for American political life; 2. as a basis for business success. 3. Compare the generalizations of economics with those of physics, of biology.

2. *Economic Aspects of Other Studies*

It is only when we see what economic aspects of other studies and what economic technique are involved in some phases of modern secondary education, that we perceive the full need for separate classification of the economic group. The most important economic aspects of other studies are the following: —

1. Commercial geography.
2. Commercial history.
3. Commercial mathematics.
4. Economic physics, chemistry, and biology.
5. Modern foreign languages as commercial tools.
6. Mechanical drawing.

DISCUSSION: — Are these subjects in commercial and manual training courses an equivalent of the more general treatment of the same subjects in literary and scientific courses?

3. *Technique of Economics*

The technique of economics has had a remarkable development during the last twenty years, giving rise to new types of schools and causing not a little astonishment among that group of men who have not been able to adjust

their educational theories to the industrial situation. This technique as it appears in the high school naturally divides as follows: —

1. Technique pertaining to production:
   a. Manual training for boys.
   b. Cooking, sewing, designing, and other forms of industrial training for girls.
2. Technique pertaining to distribution:
   a. Bookkeeping.
   b. Banking and finance.
   c. Typewriting and stenography.
   d. Laboratory study of commercial products.

Since the educational significance of technique will form a special topic for later consideration, its further discussion at this point is unnecessary.

CHAPTER V

THE ORGANIZATION OF STUDIES INTO CURRICULA

1. The Twofold Aspect of all School Studies: Knowledge and Technique, or the Acquisition of Efficiency, in Use.

The preceding chapters have discussed the classification and relative educational worth of the studies as based on their content. Nothing has been said, however, as to how this worth is to be realized by the student. It is evident at a glance, first, that no one student is able profitably to pursue all these branches of study, since this is prevented by lack of time; and, second, that natural sequence and relative importance among the studies make it inadvisable for the student to pursue every study selected throughout his whole school course. We are consequently compelled first of all to set ourselves the problem of selecting suitable portions of the studies to be pursued, deciding when they shall be begun, in what order taken up, and how long they shall be studied. These appear simple matters, yet we shall find that our whole conception of education is involved in the decisions we make.

A distinction of fundamental importance in the making

of the curriculum, as well as in the whole process of teaching, is that between the acquisition of knowledge on the one hand and the acquisition of skill and efficiency in its application on the other. The latter is called *technique*. The thesis of this Section is, that we must recognize this twofold aspect in every study, and provide time in the curriculum and place in the school for the acquisition of both knowledge of its content and technique in its use.

The subject may be, and indeed in some cases has been, approached from diverse points of view, a few of which may be briefly mentioned.

1. The fundamental purposes for the acquisition of the technique of a study are two: (*a*) That the student may be able to apply his knowledge of the study readily and skilfully in those departments of practical life in which it may be found useful; (*b*) The reflex action that the acquisition of skill in the use of knowledge has upon the quality of the knowledge itself, since in the effort to attain skill in use, insight is deepened, memory rendered more secure, and interest strengthened.

2. Mental processes are arrested at an incomplete stage of development when insight only is sought, since cognition alone is emphasized, whereas the complete cycle of mental activity embraces cognition, feeling, or emotion (often in the form of interested attention) and that form of volitional action which consists of doing something. An idea that stops at cognition might perhaps be called *clear* and one

that completes the cycle above described *vivid.* A clear idea, or one that is arrested at the stage of cognition, may perhaps enlighten the understanding, but it does not warm the feelings or give scope to volitional action. We are inclined to think our work done when the student apperceives, but this is only the stage of clearness; if we would have him reach the stage of vividness, we must see that he acquires the necessary technique.

3. The modern psychologist emphasizes the reciprocal dependence of sensory and motor powers, showing that each is essential to the perfect development of the other. Consequently all school work should make provision not only for the sensory-intellectual in the apprehension of fact and law, but also for the intellectual-motor in the acquisition of that form of efficiency that we term technique. Professor James[1] recognizes the importance of this distinction when he exclaims, "No impression without expression!" By this he means that every sensory impression shall find its adequate expression not only through the vocal organs in speech or song, but also through the hand in writing, drawing, moulding, or in the use of tools, apparatus, and utensils. In other words ideas must not only be clear, but must also become vivid through the appropriate use of the motor system of the physical organism; we must have not knowledge alone, but also the skill that comes from its application.

[1] "Talks to Teachers," pp. 33–38.

4. Professor Dewey[1] emphasizes this same distinction under the terms *Content* and *Form*. To acquire the 'content' of a study we master the facts and laws which human experience and reflection have gathered and formulated. The content of a study is a social product to be transmitted to youth. To acquire the 'form' of a study we master the technique which enables us to use this social product in the society of which we are now, or are later to become, a part. The form of a study is a social instrumentality to be acquired by youth in order to make the content effective in practical life. Reciprocally, we gain insight in order to be efficient, and we train ourselves in efficiency that we may deepen the insight and realize its importance in the world. Pestalozzi said of his century: "The worst gift, perhaps, that an evil genius has made to our age is *knowledge without training in efficiency.*"

5. Finally, a truer, more adequate, and more organic formation of the curriculum can be made with than without this distinction; for, as shown in Section 78, if we confine the acquisition of skill to singing and drawing, thus making these exercises merely accessory and more or less incidental, we put into the course of study something that does not organically belong to it. Furthermore, such a conception of technique would wholly fail to account for

[1] "The Ethical Element in Education," Third Year-Book, National Herbart Society, p. 18.

modern developments of the curriculum as seen in manual training and commercial high schools. But when this distinction is recognized as of universal validity for all studies, and it is also seen that changing circumstances change the emphasis that is to be put now upon the one, now upon the other of these elements, the construction of different curricula from the same studies for different kinds of schools or different classes of students becomes, logically at least, easy and natural.[1]

Discussion: — Extent to which this principle has been hitherto recognized.

Sometimes the acquisition of technique calls for a special place and equipment, sometimes it can be acquired without them. The natural sciences call for laboratory and field work, and usually for a special equipment of apparatus, as in physics and chemistry; manual training needs workshops, tools, and machines; commercial schools or courses demand laboratories, business offices, and the appliances used in communication. It would be a distinct gain in all secondary education if the workroom idea involved in the acquisition of technique could find adequate visible expression in laboratories, workshops, apparatus, and above all of *work desks* that are capable of easy transformation according to the use to which they are to be put. The same need is felt in the elementary

[1] See Outline, pp. 281–284.

school. Dewey, trying to find some school desks suitable for work, thus narrates his experience: "Some years ago I was looking about the school-supply stores in the city, trying to find desks and chairs which seemed thoroughly suitable from all points of view — artistic, hygienic, and educational. We had a good deal of difficulty in finding what we needed, and one dealer, more intelligent than the rest, made this remark, 'I am afraid we have not what you want. You want something at which the children may work; these are all for listening.' That tells the story of the traditional education."

In order to show how the study groups appear when this distinction between knowledge and technique is everywhere made, the following table is arranged: —

Twofold Aspect of all High-school Studies

Knowledge — Insight	Technique — Efficiency in Use

Group I

1. *Mathematics*

Intellectual grasp of fundamental conceptions and progressive mastery of the principles of algebra, geometry, and trigonometry.	Laboratory practice in solving problems by demonstration and graphic methods; application especially to problems connected with physics.

2. *Physics*

Insight derived from text-book, lecture, and experiment.	Laboratory practice for induction and verification.

3. *Chemistry*

Knowledge of the laws of chemical action derived through experiment, text-book, and lecture.	Laboratory practice for induction and verification, and analysis of compounds.

GROUP II

Biology

Knowledge of classification, morphology, anatomy, function, etc., in zoölogy, botany, and physiology.	Laboratory and field practice, in dissecting, gathering, classifying, etc., as well as in determining life-history and function. Physical training in and out of school.

GROUP III

The Earth Sciences

Knowledge of facts and insight into laws of mathematical and physical geography and geology.	Field and laboratory practice in observation, demonstration, relief moulding, recognition and classification of specimens, etc.

GROUP IV

1. *Ancient Languages*

Knowledge and appreciation of literary content and of grammatical and rhetorical principles.	Practical application of linguistic distinctions to text. Translation into English.

2. Modern Foreign Languages

Acquisition of the literary content of works read; comprehension of mental life of modern foreign peoples.	Drill in pronunciation, and use of words both in oral and written speech. Application of grammar so far as necessary for understanding and use of the language.

3. English

Appreciative mastery of literary content; also comprehension of grammatical and rhetorical principles.	Workroom practice in English composition; in dramatic representation, and the application of grammatical and rhetorical principles.

GROUP V

The Fine Arts

Æsthetic understanding and application of music, painting and drawing, sculpture and architecture, through contemplative study.	Acquisition of artistic technique through singing, playing on instruments, drawing, painting, moulding, decorative design, etc.

GROUP VI

History

Knowledge of political evolution through study of ancient, mediæval and modern, history. Study of the machinery of national and local self-government.	Exercise in methods of parliamentary procedure through literary and debating societies, congresses, clubs, athletic associations, etc. In some cases, practice in self-government, as in the school city, or in such institutions as the George Junior Republic.

Group VII

Economics

Insight into economic laws of production, distribution, and consumption; study of economic side of mathematics, natural sciences, and languages.

Technique of production as in mechanical drawing, designing, manual training, cooking, handicrafts, etc.

Technique of distribution as in accounts, stenography, typewriting, laboratory study of commercial products, commercial use of modern languages, etc.

It is interesting to note that by thus extending the workshop idea to all the studies, we bring education again into line with race experience, in which most learning has been obtained in connection with practice in field, shop, or public life. This perhaps helps to account for the growing interest of the young in their studies that is nearly always observed when there is muscular activity in laboratory, workroom, or machine shop.

Again, this arrangement restores healthful relations between mental and physical exertion. Were all our schoolrooms fitted with desks both for sitting and for standing, for writing and for tool work, at least of the lighter and cleaner kinds; also were the spirit of social coöperation encouraged among the students, and accompanied by the liberty of moving about for mutual conference and assistance, as is the case to some extent in natural

science laboratories and machine shops, the physical well-being of our students would almost take care of itself.

It is a general observation often accompanied with expressions of regret, that students in professional courses in higher institutions manifest far more zeal, enthusiasm, and diligence than those who are pursuing a course in general culture. Among the reasons for this state of things is the fact that professional education always has a strong objective side, as in moot courts, clinics, practice schools, machine shops, laboratories, etc., whereas general education is frequently confined to things of thought alone.

The one provides for a balance between insight and efficiency in use, whereas the other is inclined to confine its field of activity to insight alone. But if we consistently carry out the workshop idea in all studies, allowing no insight to be unaccompanied by the appropriate training in its technique, the greatest cause of apathy in culture courses will be removed.[1]

Discussion: — 1. Extent to which the workshop idea may take the place of physical training. 2. Effect of laboratory work on school discipline. 3. Extent to which the laboratory and workshop practice is a legitimate field for specializing. 4. Intimacy of thought and laboratory and workshop practice

[1] For an illustration of how this can be accomplished in English Composition, see Buck, "Laboratory Method in Teaching English," Proceedings N. E. A., 1904, pp. 506–508.

as a condition for securing the educational value of the latter. 5. Relative importance of the laboratory practice in the various subjects in enhancing insight and retention.

2. Principles of Selection and Arrangement of Studies and Topics

To adjust education to the multiplication of studies on the one hand, and to the diversities of training demanded by modern society on the other, Germany has adopted two types of fixed courses of study for general or cultural education; one found in the *Gymnasium* and the other in the *Realgymnasium*. Other schools are provided which omit one or more of the last years from the full course. These courses are fixed by public authority and may not be changed except by the authority that made them. The aim of each of these schools is to give a rounded education, the chief difference being one of emphasis, since about the only difference in studies is that English may be substituted for Greek in all schools of the *Real* type.

One of the chief defects of this inelastic system is that in the attempt to get all types of studies into the curriculum and to give each study the amount of time necessary for good results, the student is overworked to such an extent that his sight is usually impaired, and not infrequently his health also. The number of fifty or fifty-five minute periods per week, even for six-year-old boys, ranges from 30 to 33. A second serious defect is that, outside of the

mere choice of a school, which is not often possible, no attention is paid to individual preference or fitness in the selection of the studies to be pursued, or to the amount of time that shall be devoted to a study that is found in the program. There stands the school with its single fixed course of study; the student is permitted only this alternative — to take it or to leave it.[1]

[1] The following from the report of Dr. Dunker, member of the Royal Prussian Industrial Commission of 1904, shows the evil effects of the inelastic course in Germany: "Shopwork, in accordance with a fundamental but often forgotten educational principle, rests upon the native instincts of the growing human being. Not every boy of approximately high-school age is inclined to scientific studies, but almost every boy has an instinctive desire to create with the hand something concrete and tangible. To direct and cultivate this instinct must be the task of a rational education. Now, the advocates of manual training have always emphasized the point that they desire, by means of this manual training, to attract to the middle school pupils that are not drawn to higher culture by literary interests. Such pupils, who are not in themselves bad or mentally deficient, but whose interest cannot be reached by a one-sided school, are found in all countries. With us they are kept in the higher, almost purely literary, school by the pressure of military privileges. Beginning with Quarta (about fourteen years of age), they embarrass the classes, vex the teachers, lower the standard of instruction, and therefore that of the entire school, become over-aged, and secure at best the military privilege of one year's army service (instead of two). If they turn out well in some vocation in later life it is in spite of the school, not because of the school. Very often, however, they enter upon practical life morose natures, without faith in themselves and their calling, without energy, without creative ardor, irritated against the school that failed to reach them. Of the best the school can give, of the desire for progress, of the yearning for more and higher things, they have not felt a breath; their culture has come to an end, but also for effective manual work they are spoiled."

The best American practice deviates from the German plan in two important particulars. In the first place, it provides many more courses of study from which the student may take his choice. The courses, moreover, differ widely not only as to the studies they contain, but also as to the time to be devoted to each branch. The second deviation from the German practice is, to give the student considerable latitude both in the choice of studies and in the length of time that shall be devoted to them. Some schools have even gone to the extent of making all studies elective, but this is not common.

DISCUSSION: — 1. Possibility and desirability of limiting American secondary education to two or three closely related courses of study. 2. Compare the second cycle of French high schools with the American and German curricula.[1]

If, however, the responsibility for the construction of a course of study is to be divided between the individual student and society as represented by parents and school officers, the question naturally arises: According to what principles shall this division take place; also what shall society prescribe; what shall the student be allowed to elect?

The answer to such questions depends upon one's conception of the leading purposes of secondary education for normal individuals. If it is decided that the purpose is

[1] See Farrington, F. E., "French Secondary Schools."

purely 'cultural,' then one must determine what studies conduce to this end, and prescribe them; or if they are too numerous for prescription, then must one prescribe some, and offer a choice among those that remain. If one decides that secondary education shall be governed by the extrance conditions for higher institutions, then the prescription is determined by the requirements. If, however, one refuses to be bound by inherited ideals, on the one hand, or by the entrance requirements of higher institutions, on the other, and declares that the first purpose of the secondary school is to make education general, in the sense that it trains the student in every type of mental action and introduces him to every typical form of social, political, and industrial life, as revealed by language, science, art, history, and economics; and if, in addition, one declares that secondary education is special and practical only as it trains every student to be efficient with the knowledge he has acquired; then it becomes fairly evident that the school must prescribe those typical forms of mental training that long experience, reënforced by the analysis of relative educational values, shows to be necessary to all-round insight and efficiency. In brief, the field for prescription is departments, groups, or types of study; that for election is specific studies within the prescribed groups. A similar problem arises also when we consider not only the *what* but the *how much*. These and other related problems are considered in detail in the following sections: —

1. *Prescription and Election of Studies*

To the youth, blessed with health, mental ability, and financial means, the secondary or cultural stage of education reduces itself finally to the acquisition of such knowledge and skill as will best prepare him for what Herbert Spencer calls "complete living," and must include what is fairly representative not only of those sciences that conduce to physical well-being and economic welfare, but also those sciences and arts that conduce to social survival in institutional life, as well as to personal happiness and development.

Since the school authorities as the representatives of civilization have not only the responsibility of knowing what should be transmitted to the new generation, but have also the duty of seeing that no important acquisition be lost, it might seem at first glance as if prescription of studies were the only rational course to be pursued. But further reflection shows that it is practically impossible to prescribe for any one youth the study of all the world's acquisition of science and art, so that the principle of division of labor is as necessary in learning as it is in earning. Furthermore, since natural personal differences in taste, ability, industry, and destination that always exist are greatly multiplied in a democracy, where the students come from every stratum of society and go into every species of the world's work, it is evident that a modern high-school administration should permit the exercise of a certain

amount of personal choice in the selection of studies and in the relative emphasis that shall be placed upon them.

The minimum of prescription is indicated by our study of relative educational values. No important field of knowledge must be overlooked; no essential type of mental training ignored. Following the order of our discussion of values, we see that the great types are the natural sciences, the humanities, and the economic studies. Of the first grand division mathematics, an exact science, and an evolutionary science are necessary to representative completeness of knowledge and mental training; of the second grand division, linguistics, literature, art, and history form the irreducible minimum; of the third or economic grand division, some mastery of economic theory and some manual training or some skill in using the machinery of exchange are the essentials. In small high schools it may be necessary to confine the whole course of study to these few representatives of general culture. The larger the teaching body, however, the more courses can be provided, and the larger the range of electives may be. The chief differences among courses of study such as classical, Latin-scientific, English, manual training, commercial, etc., will pertain first to the studies that shall be selected to represent the various groups, and second to the amount of time that shall be devoted to each. No course of study can be pronounced educationally complete unless it contains a representative from every study group: nor can any course, how-

ever complete in this respect, be considered efficient that does not give to each study the amount of time and attention necessary for effective mastery, both as to knowledge and as to skill.

The school is responsible for seeing that through the studies prescribed by authority and those elected by personal preference the student's secondary education shall be fairly complete both in range and quality. Some departments have been anticipated in the elementary schools and some find their culmination in college or university; both these facts must be taken into consideration in arranging the curricula for high schools.

Discussion: — 1. Apply the principles stated in this section to the curricula of secondary education in Germany, France, and England. 2. The time element in making studies, languages, history, science, etc., educationally effective.

2. *Selection and Sequence of Topics. Educational Interpretation of the Theory of Recapitulation.*

This subject has been more extensively discussed in elementary than in secondary education.[1] The Ziller theory is briefly as follows: Education has first to do with a developing mind; and second with the cultural products of a civilization that has developed through many stages of historical progress. The mind of a child, in analogy with

[1] See First and Second Year-Books of the National Herbart Society; DeGarmo, "Herbart and the Herbartians," pp. 107–112; Hall, "Adolescence," Vol. II, Chapter XVI.

the physical embryo of an animal, recapitulates in a few years the slow evolution of the race, for just as the embryo of one of the higher animals in its unfolding is known to pass through all the essential stages of development manifested by lower orders, so the child in his mental development may be conceived to have passed through in a short space of time all the great culture epochs that have marked the race evolution. What follows from this supposed parallelism? For Ziller the conclusion, one may say the unproved assumption, that the culture material for the education of the child at any given stage in his mental development must be drawn from the culture products of the race when it was in the corresponding stage of evolution.

"It is obvious," says Rein, "that, if the two series — the historical, with its culture materials; and the personal with its manifold ideas, wishes, and desires — can be brought successfully and accurately into harmony with each other, one can undoubtedly get control of the pupil's interest, because by this means the psychological conditions would be best established.[1]" Extended efforts have been made by the Ziller wing of the Herbartian School of educational thought to carry this theory into practice, but it need not surprise us that an important educational procedure that is founded first on an analogy and then upon an assumption, should be as vigorously opposed as it is

[1] "Outline of Pedagogics," p. 96.

vigorously exploited. Many depreciate the force of the analogy, while others deny the validity of the assumption.

Ziller maintains that because race and individual stages of development are parallel, *therefore* the culture products of the race are the proper material for the instruction of the child when he is in a corresponding stage. This conclusion, argues Dewey,[1] is not legitimate; for it does not follow logically, while the experience that seems to confirm it can be better explained in another way. Granting the parallelism between individual and racial development, what is it that really corresponds? Not the content of knowledge as seen in culture products, for these may be valuable or worthless, appropriate or inappropriate, as the case may be, but rather the typical modes of reaction to stimulation. If the race has through long ages in the struggle for existence developed the hunting instinct, or the impulse to pursue agriculture or to use tools, we may perhaps expect to find strong traces of these instincts or impulses in children at the appropriate stages of their mental development. This explains, in the opinion of many, why all boys are likely to be particularly receptive to subject-matter or exercises that give mental or physical scope to these inherited tendencies, and it furnishes strong intimations to the teacher concerning the selection of subject-matter, and the training in technique necessary to make the knowledge effective.

[1] Second Year-Book, National Herbart Society, pp. 89–95.

It may further be pointed out that the plan of selecting material from the cultural products of a distant past ignores the value of the present environment in furnishing an apperceptive basis for all education. Is it not somewhat of a contradiction in educational practice to borrow one's subject-matter from ancient sources, while being compelled to rely upon the pupil's experience in a modern environment for its comprehension? Why is not a modern youth who knows about railroads, steamboats, and bridges, gunpowder, rapid-fire cannon, and repeating rifles with their small caliber and smokeless powder; balloons, field glasses, and telegraphy, in a better condition to understand a modern war, than he is to comprehend a Persian invasion of Greece or a campaign of Cæsar against the Gauls? All we have to do to enable the student to understand even the most complicated machinery of industry or institutional organization is first to point out clearly its purpose, and then to analyze the whole into its constituent elements. In this way, both apperception and knowledge to be apperceived come from the same environment. All that is valuable of past culture epochs, is incorporated as elements in the present culture epoch, and may easily be mastered, everything in its own good time.[1]

[1] The best extended exposition of the results of Herbartian thought in elementary education as amended and developed by American experience and common sense is found in the works of Dr. Charles A. McMurry upon the various studies of the curriculum: The Macmillan Co.

Discussion: — Relative force of the argument for (*a*) the cultural products, (*b*) the modes of reaction to stimulus, (*c*) the present environment.

The application of the doctrine of individual recapitulation of race development to secondary education is most extensively made by President Hall in his monumental work on "Adolescence." A few extracts from President Hall's sketch of the ideal school[1] will give a concrete notion of how in his opinion education in the secondary stage should adjust itself to the adolescent nature of youth: —

"First of all, the drill and mechanism of the previous period must be gradually relaxed, and an appeal must be made to freedom and interest. Individuality must have a far longer tether. We must, and can, really teach nothing that does not appeal to interests deep enough to make it seem of almost supreme value in the world. Hence, there must be a wide range of elective study for those who continue at school.

"A conclusive and far-reaching principle is that at no other stage of life is the power to appreciate and apprehend so far ahead of the power to express. Hence we should let up on examinations; we should cast our bread upon the waters, knowing that it will be found after many days, because so sensitized is the soul now that nothing is lost.

[1] Hall, "The Ideal School as based on Child Study," Proceedings N. E. A., 1901, pp. 484–488.

Mental and moral teaching and influences sink at once too deep to be reproduced in examinations of the present type, without injury to both mind and will.

"The youth is all insight and receptivity; he has just entered the stage of apprenticeship to life; he has awakened to it as at a second birth, and has found all things new and glorious.

"The teacher's cue is now to graft the soul all over with buds and scions, and not to try to gather a harvest. The fundamentals of the soul, which are instinct and intuition, and not pure intellect, are now in season. We must lay new and larger foundations.

"The high school has lost its independence (is now a mere link in an educational chain), and of all stages and grades has least interest in the large problems of education; namely, what to teach and how, in order to develop the nascent periods during the teens and to save powers now new-born in most profusion, but sure to be atrophied or perverted if not studied with tact and federated with individual adaptation. — High-school teachers have abandoned all initiative, have renounced their birthright of interpreting and ministering to the needs of one stage of life. Their motto seems to be, *Non vitæ sed scholæ discimus.* — Noble ideals are gone; the independent function of the secondary stage of education is almost abandoned; and the pupil and teacher devote themselves to a routine of tasks in an artificial program imposed by

the will of others, and fitting, not for the world, but for college.

"The teacher must teach more, and know more; he must be a living fountain, not a stagnant pool. He should not be a dealer in desiccated, second-hand knowledge, a mere giver-out and hearer of lessons. That is the chief and humiliating difference between our secondary teachers and those abroad, who are mostly doctors of philosophy as they should be."

This is the voice of an American Rousseau, who would bud the juicy naval orange upon the sour stock of the rough lemon, who sees visions and dreams dreams, who brings all the resources of his knowledge and eloquence, far greater than those of the old Rousseau, to bear upon the teacher that he may understand and lead aright the fresh young life whose intellectual and moral unfolding is so largely intrusted to his guidance.

Liberally interpreted, the foregoing intimations drawn from the study of adolescent characteristics may be summarized as follows:—

1. The studies must be chosen from every field of knowledge that is important for life, for "The teacher's cue is now to graft the soul all over with buds and scions."

2. The youth shall have the opportunity to study those departments and phases of knowledge that most keenly awake his slumbering interests; hence (1) many elective studies, and (2) permission to gratify to the utmost his

interest for the striking, the novel, the mysterious, and the practically important. This second point is illustrated by President Hall's recommendations concerning high-school physics.[1] Physics, he thinks, should not be dry and formal, not mathematical and strictly scientific, as it is in the university, but concrete, thought- and interest-provoking, and elastic enough to permit the student, through a free use of the laboratory, to examine as far as he will and can, the impressive phenomena already enumerated, such as argon, liquid air, X-rays, telegraph, telephone, graphophone, telautograph, wireless telegraphy, dynamos and electric motors, high and low potentials, single and alternating currents, locomotives, automobile gasolene engines, steam turbines, telescope, microscope, prisms for spectrum analysis, etc. Physics is not to consist alone of these side excursions, but it is to whet and satisfy curiosity concerning them, and thus lead gradually to the resolution on the student's part to master the science that shows how to comprehend and use them. It is easy, here as everywhere else, to inoculate the young mind against that life interest in the subject which should dwell with it long after the student leaves the high school. He must not be left in the mental condition of the youth who refused to see an artistic exhibition of "Hamlet" on the stage, on the ground that he was sick of "Hamlet," having studied it in school and looked up all the references.

[1] "Adolescence," Vol. II, Chapter XII.

3. "The teacher must be a living fountain, not a stagnant pool." He must know more and teach better, not as the mere examiner, or the purveyor of canned goods, but as the inspiring guide, who, while he imparts one increment of knowledge and skill, whets the appetite for another.

DISCUSSION: — Compare the validity of these arguments with that of the considerations presented on pp. 292–295.

3. *The Correlation of High-school Subject-matter*

The problem of the best possible correlation of studies, that is, their best arrangement as to juxtaposition and succession, is one that has a long history, and one which in the course of time has seen many solutions. When subjects were few and educational aims simple or single, the problem was of easy solution; but it has grown difficult as studies have increased in complexity and number, and as educational aims have become numerous or many-sided.

In this as in other fields the theories of Plato have played an important rôle. According to his thought, there are two worlds, a transcendent and a sensuous one. The transcendent world is the world of ideas; the sensible world is that of phenomena. These two worlds, though disparate, are so related that the phenomena of the sense world are the images or counterparts of the transcendent ideas of the unseen world, which in turn are the prototypes

of the sense images. It is the function of our *senses* to apprehend the phenomena; that of our *reason* to apprehend the ideas. Just as phenomena and ideas are disparate, that is, belong to distinct worlds, so sense and reason are likewise disparate, or of unlike nature, and need a mediator capable of bringing them into proper relations. This mediator Plato saw in mathematics, in that on the one hand mathematics has to do with things of sense in the calculation of magnitudes, and on the other, proceeds by the exercise of reason to investigate the eternal relations of things. Thus, for example, the relation of the hypothenuse to the legs of a right triangle has to do with a concrete instance of a particular triangle, and with an eternal law which has been and will be true throughout all the vast eons of time and in every nook and cranny of space, which, like the ideas themselves, must stand though the heavens fall. Since the Greek program consisted alone of language, mathematics, and philosophy, and since with Plato the final end of education was to produce the philosopher, the natural as well as the rational order of studies was (1) Language (especially poetry), (2) Mathematics (especially geometry), (3) Philosophy. This program is simple yet beautiful in its perfection, as may be seen in the following exposition:—

1. Language is empirical for it deals with words, sentences, and literary wholes. It proceeds through inductive study to rules. These are of many-sided application and

form the key to all knowledge. Poetry and prose literary masterpieces expand to take in the whole world of sensible perceptions.

2. Mathematics is a rational science mostly deductive in character and sets the demonstrative reason to work. Like poetry it is empirical and elementary in that it has to do with magnitudes that appeal to sense; but unlike poetry it leads to the comprehension of universal laws, and since mathematics is the science of the problem, it leads back again into the world of sense.

3. Philosophy, like mathematics, is rational and deductive. It gets small assistance, however, from the world of sense, while it demands the highest possible exercise of abstract thought.

The early Christian thinkers accepted in general Plato's philosophy, and with it his order of studies, which now took the following form:—

1. The trivium (speech—grammar, rhetoric, dialectics).

2. The quadrivium (mathematics—arithmetic, geometry, music, and astronomy).

3. Philosophy and theology.

Since their aim was to educate the priest, as Plato's was to develop the philosopher, the schoolmen had to take but one additional step, namely, theology, in order to complete their curriculum. They could therefore preserve the organic construction of Plato's course of study. The history of education shows how this unity devised by

the schoolmen was destroyed by the nominalists, the humanists, and the scientists. We shall in all probability never see its like again, for the old world has departed, and with it its unity of aim and its simplicity of subject-matter. Then but a single class of the population was to be educated, now all classes claim it as an inherent right of mankind; then a single aim was dominant, now the ends of education are manifold; then only a little teachable knowledge was available, now the labors of thousands for generations have increased the amount of teachable knowledge beyond the needs and capacities of any individual or class of individuals. Yet, for all that, the need for an organic course of study for every department of general education has not left the world; the problem is still with us, but it must have a new solution, or better, a number of new solutions.

Discussion: — To what degree do the various curricula presented in the appendix approximate to Plato's scheme of correlation?

Herbart suggested that related topics should be taught simultaneously in order to extend and intensify all interests created. Ziller, following up this suggestion and uniting his theory of the historical stages of culture with his ethico-religious aim of education, devised an elaborate plan of what he called concentration of instruction. According to this scheme, the humanistic aspects

of the curriculum must take the lead and dominate all others, for two reasons; namely, they presumably have more ethical and religious value than the others, and they can be taught according to historical stages. Consequently the elementary curriculum, with which Ziller principally busied himself, consists of a core of history, biblical and secular, and literature. About this core, which progresses by parallel historical stages of the various topics, all the facts and laws of nature are attached by mere association, usually mechanical and far-fetched. Three results, Ziller thought, might be thereby effected:—

(1) The unity of psychical life in the child might be strengthened, since he would have to regard simultaneously and as related all the ideas imparted or generated by education; (2) all the interests aroused by instruction would be centralized, strengthened, and extended in every direction until they penetrated every department of knowledge; (3) everything taught in the curriculum would take on an ethico-religious aspect as though seen through colored glasses, and the moral and religious character of the child would presumably be brought to an ideal state of perfection.

For several rather obvious reasons Ziller's hopes have not been widely realized. In the first place, it has never been proved that psychological unity concerning discrete things is desirable. Why should we desire even to be in condition to think of everything when we think of

anything? To have a tendency to do so might be very uncomfortable, or even unsettling to one's peace of mind. The habit of not thinking of unrelated matters is certainly one of the negative blessings of life, which should not be lightly put in jeopardy by the schoolmaster. In the next place, it has not been proved that interest is strengthened by the diffusion involved in extending it in every direction. The strong interests in life are marked by concentration to a small group of closely related things; why should not the same be true in education? Finally, the development of moral character of good fibre is not a matter of such innocent simplicity as Ziller seems to assume. True piety is hardly engendered by a pious regard of things piously indifferent. No serious effort has ever been made to extend the Ziller theory of concentration to secondary education.

Another scheme of concentration for elementary education was proposed by the late Colonel Parker,[1] which was based upon the philosophical unity of knowledge. This naturally could not be a psychological concentration on the part of the child, for he is too immature either to perceive or, even if he could perceive, to appreciate such relations. Parker's scheme would have had much better chance of successful application, psychologically considered, in the college than in the elementary school. The subjects thus organized are mineralogy, geology, geogra-

[1] F. W. Parker, "Theory of Concentration."

phy, astronomy, biology, zoölogy, anthropology, and history — a list of names that reminds us of Herbert Spencer's plea for science in his "Education." Necessarily in such a plan the logical rather than the psychological principle of sequence comes to the front. This principle is effective for the young, however, only when the subject-matter thus organized is so simple that the logical arrangement is at the same time the best psychological one, as in Plato's scheme of poetry, mathematics, and philosophy.

Discussion: — Extent to which the logical coincides with the psychological sequence in representative studies like mathematics, physics, history.

Modern attempts to find a single adequate principle of correlation among the studies themselves having apparently proved unsuccessful, the only remaining recourse on this side of the problem is to examine the various studies in detail in order to discover and utilize such natural relations as may be found to exist among them. The leading interrelations may, therefore, be taken up in detail.

1. **Mathematics**. Even if this subject has lost the commanding place it held in ancient educational systems as the mediator between the apprehensions of sense and the processes of reason, it still performs a similar function. It is the presupposition and necessary propædeutic for all departments of pure and applied quantitative science,

such as physics, astronomy, to some extent chemistry also, and all departments of engineering. It underlies the theory of music, and has indirect relations to drawing and the theory of the beautiful. "Æsthetics in a certain sense coincides with mathematics, the difference between the two sciences consisting in this: Mathematics concerns itself only with the rationality of time and space perceptions, whereas æsthetics considers also the effect of this rationality upon our sensibilities." [1]

Upon the psychical side it still has the same training power for the reason that it had in Plato's time. Every student who learns through the study of geometry what a demonstration really is, feels, as did Lincoln when he had read the first book of Euclid, that he now knows what proof is.

2. **Geography,— the where.** Herbart called geography the associating science. It has in its various aspects undoubtedly more relations to the other branches of the curriculum than any other study. Its intimate connection with history, which must always have a place in which to unfold, and whose contingencies depend in large measure upon geographical elements, like land structure, rivers, food-supply, weather, etc., has long been observed by schoolmen. As mathematical geography it is closely related to elementary astronomy; as physical geography,

[1] Zeifing, "Neue Lehre von den Proportionen des menschlichen Körpers."

to plant and animal life as described in botany and zoölogy; as commercial geography, to economic production and exchange. Even literature and art are not wholly independent of place, and hence have their geographical aspects.

3. **Philosophy**. Though not a subject of high-school study, philosophy is of great importance to the teacher in enabling him to perceive the intimacy of the interrelations that exist among the departments of high-school study. Ethics reveals the hierarchy of ends in education, as elsewhere, and psychology reveals the means for reaching them. Metaphysics undertakes to unify, or bring into relation to ultimate ends, all the various departments of human thought and action.

4. **History, — the when**. As an associating discipline, history is less elementary than geography and less abstract than philosophy. In some departments the *when* is important, as in literature and art; in science it is less important, for sciences reign in the world because of what they are, rather than because of what they were. Yet interest in the present stages of development can often be enhanced by reference to former stages. In some cases comprehension is assisted by historical study of the science, as in the case of the atomic theory in chemistry.

5. **Language**. Language has relation to all sciences, for it is the means of their expression. The study of language, to be of most importance and use as an asso-

ciating science, must everywhere deal with the things of nature and civilization. This is especially true of the literature to be read by the student.

6. **The Hand.** All those subjects are naturally associated which demand the skilful use of the hand in the mastery of their technique, as in the laboratory, the drawing room, and the workshop. This unites by a new bond the exact and the biological sciences, fine art and craftsmanship, drawing and the mechanic arts.

Dewey[1] makes a convincing argument to show that the only really adequate correlation of studies will come, not so much through the discovery of internal likenesses and equivalences, as through sincere effort to correlate the studies in the school with the life activities to which they relate. He thinks, moreover, that the connecting link between the insight of the school and the institutional and industrial life outside the school is the laboratory, drawing room, or workshop, because it is here that the student's thought finds its first life-conforming expression. But when all studies are seen in their relations to the life activities which they explain and for which they prepare, it is evident that each will find its natural relations to every other in the student's mind, and that without any soul-racking effort on the part of the teacher to find some universal law of thought gravitation which shall bind all together in a beautiful system.

[1] "School and Society," pp. 77–110.

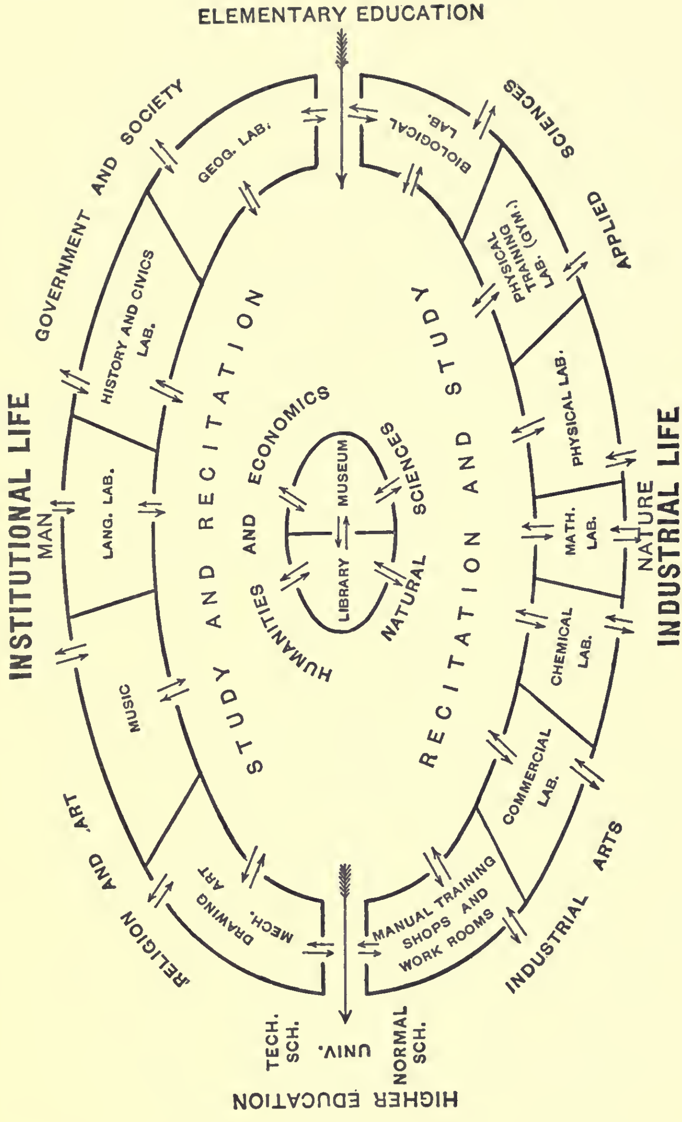
The accompanying diagram may serve to show at a glance how this idea works out in actual practice, and reënforces the recommendation already made that theory and practice, insight and efficiency, should go ever hand in hand.

DISCUSSION: — Extent to which the laboratory and workshop idea is: (*a*) desirable, (*b*) attainable, and (*c*) already attained.

4. *Practical Considerations in the Construction of Courses of Study*

In the making of a curriculum of study for actual use, theoretical considerations are nearly always modified by practical ones of tradition, public authority, and often mere feasibility as determined by financial support, material equipment or teaching force. The following exposition treats of a number of important topics from this standpoint: —

1. **Juxtaposition** *vs.* **Succession in the Arrangement of Studies.** Opinions of schoolmen as well as customs of countries differ as to what is the ideal program so far as the arrangement of studies in juxtaposition or succession is considered. In Germany, for instance, public authority decrees that many studies shall be carried on, side by side, for a series of years, a small number of hours per week on the average being given to each. During the four years corresponding most nearly to our high-school


ELEMENTARY EDUCATION
GOVERNMENT AND SOCIETY
SCIENCES
APPLIED
INSTITUTIONAL LIFE
MAN
INDUSTRIAL LIFE
NATURE
GEOG. LAB.
BIOLOGICAL LAB.
HISTORY AND CIVICS LAB.
PHYSICAL TRAINING (GYM.) LAB.
LANG. LAB.
PHYSICAL LAB.
MATH. LAB.
CHEMICAL LAB.
MUSIC
COMMERCIAL LAB.
MECH. DRAWING ART
MANUAL TRAINING SHOPS AND WORK ROOMS
STUDY AND RECITATION
RECITATION AND STUDY
HUMANITIES AND ECONOMICS
NATURAL SCIENCES
MUSEUM
LIBRARY
RELIGION AND ART
INDUSTRIAL ARTS
TECH. SCH.
UNIV.
NORMAL SCH.
HIGHER EDUCATION

course (III^b, III^a, II^b, II^a) the Prussian Realgymnasium always has as many as eleven subjects taught simultaneously, while in the third year twelve subjects are so taught.[1] In the Prussian classical Gymnasium, the first two years have eleven each, the third ten, and the fourth nine studies carried on together. The principle of succession is almost ignored in these schools, except within such related groups as mathematics and natural science. Religion, German, Latin, Greek, French, History and Geography combined as one subject, and gymnastics run through each of the four years without break. Mathematics is taught in them all; natural history in the first; and physics, chemistry, and mineralogy as one group through the remaining three. From three to five of these subjects get but two hours a week, three of them but three hours, one (Greek) has six hours, while Latin in the Gymnasium has seven hours for three years and six for one. In the Realgymnasium for the same time, Latin has four hours for each of the first two years and three for each of the last two years. Both of these courses are given in full in the appendix and may easily be compared.

To carry on so many studies at the same time, even though many of them get but two or three hours per week, it becomes necessary to hold the student for what seems to us an excessive number of hours per week, actually

[1] See Russel, J. E., "German Higher Schools."

from thirty to thirty-three or thirty-four in the Realgymnasium, and for the classical gymnasium approximately the same number. These periods are all from fifty to fifty-five minutes in length.

If the German plan may on the whole be described as that of juxtaposition, that of the American high school may lay claim to that of succession.[1]

The sample programs suggested by the Committee of Ten [2] have, as a rule, only five subjects under consideration at one time, or less than half the number of the German gymnasiums, while the number of periods per week is reduced from thirty-three to twenty, and the length of the periods from fifty or fifty-five to forty, forty-five or fifty minutes, the provision also being made that at least five of the twenty periods should be given to unprepared work. In a few cases the number of studies to be carried on at one time rises to six.

The German courses appear, and are, in fact, far more rigorous in their demands upon the student than the American, though it must at once be explained that American high schools depend much more on preparation outside the recitation than do the German gymnasiums. In the latter schools a period is divided somewhat equally between advance work and recitation, the teacher fulfilling

[1] See American High-School Programs.

[2] Report of Committee of Ten, pp. 46–47.

in considerable degree the function performed by the text-book with us.

Professor Münch suggests two formulas for determining the relative amount of juxtaposition and succession, though admitting that these formulas are of small practical value: (1) "Put as many studies into juxtaposition as you can without encountering the danger that they will neutralize rather than organically supplement one another, or that interest will be dissipated; (2) put as many studies in succession as you can without danger of exhausting interest, or of banishing from consciousness what would otherwise be valuable." [1]

The inadequacy of such formulas may easily be seen by comparing their application in German and American courses of study. Evidently this is a point where custom is much more potent than argument. Those subjects will have to be placed in juxtaposition which are held to be absolutely essential in one or more of the four years of the course; all others will easily submit to the principle of succession, the hope being that an intensive study for a term or a year will prove more beneficial than more prolonged study with fewer periods per week and with more divided interest. Geography and history mutually supplement each other and may well be placed in close juxtaposition; the same is true for algebra and geometry, though the American plan inclines to algebra in the first,

[1] "Geist des Lehramts," p. 349.

and geometry in the second year of the high school course. Physics and chemistry may be taught at the same time, though for practical reasons, such as time for ample laboratory work, and preparation for advanced work in the university, American teachers of science think it better to teach them in different years. The Report of the Committee of Ten is almost unanimous in the judgment that physics should be taught in the last year of the high school, and chemistry in the next to the last.[1] The reason for placing physics at the end of the course is that the mathematics of the first three years forms a natural introduction to it. A similar reason places grammar before rhetoric.

DISCUSSION: — Relative weight of the advantages and disadvantages of the German as compared with the American plan regarding juxtaposition and succession, in respect to (*a*) health, (*b*) interest, (*c*) permanence of mastery, (*d*) time for laboratory or other similar exercises.

2. Importance of Inner Unity in Each Study or Study Group. The need of inner unity in the several branches of study becomes imperative as the number of subjects taken into the curriculum increases. When, for example, in the early American academies mathematics was confined mostly to arithmetic, it was perhaps natural that the subject should become unduly expanded by the inclusion of a multitude of topics now excluded or transferred to higher stages of the science, such as banking, insurance, discount,

[1] Report of the Committee of Ten, p. 117.

equation of payments, and others now more easily treated in algebra, to say nothing of the arithmetical 'puzzles' inserted to try the wits of the young student. Now, however, that we have, on the one hand, a nicely graduated course of mathematics, including not only arithmetic but also elementary and advanced algebra, plane and solid geometry, and plane and spherical trigonometry, all to be mastered by the time the youth is eighteen years of age, and, on the other, a similar development of the other studies, the old tendency to side excursions through the introduction of subsidiary and non-essential matter, must be resisted, and in the case of tradition vigorously combated, in order that each subject or group of subjects, through exclusion of unnecessary topics and the proper organization of the essentials, may fall into such organic unity that the student need lose no time and waste no energy.

The complete development of this theme, however, belongs to special didactics, and must be investigated through extended study in the several fields. Many valuable reports of special committees discuss this topic at length, as do the several excellent treatises on special branches of study now available for the secondary teacher.[1]

[1] Reports and special treatises:—

a. Report of the Committee of Ten.

b. Report of Committee on College Entrance Requirements, containing Reports of the following special committees: (1) Committee of Twelve of the American Philological Association of America; (2) Committee

3. Provision for the Acquisition of Efficiency in the Use of Knowledge. What has been termed expression, form, technique, skill, etc., or the intellectual-motor side of all education, demands especial attention in the construction of a course of study, since the older practices of the school obscure its importance, even when they do not entirely overlook its newer aspects, as seen in drawing, laboratory work, manual training, etc., and consequently fail to provide adequately for the necessary time and facilities. Modern experiments in manual training schools tend to confirm the opinion that half the time of the school day may be spent in laboratory, drawing room, and shop without essentially abridging the purely intellectual accomplishment of the older type of schools, and without exposing the student to the danger of overwork, since the alternation of intellectual and manual occupation furnishes a healthful balance of bodily and mental exertion. Should this opinion be ultimately fully confirmed, one can

of Twelve of the Modern Language Association; (3) Committee of Seven of the American Historical Association; (4) Committee of Chicago Section of the Mathematical Society; (5) also Report of Committees on Physical Geography, Chemistry, Botany, Zoölogy, and Physics.

c. The Macmillan series on the Teaching of Secondary Studies, Mathematics, English, etc.

d. The Longmans, Green & Co. series on the Teaching of Secondary Studies: Latin and Greek, History and Civics, English, Mathematics, etc.

e. For a German effort to bring unity into the several branches, see Dr. Frick's proposed curriculum for a classical gymnasium, in "Herbart and the Herbartians," pp. 187–202.

see what radical improvements on the side of the acquisition of efficiency are possible even in purely humanistic courses, for every humanistic branch of study may, with proper facilities and time allotment, have a species of laboratory or workshop drill that will promote at once efficiency in use and variety of work. But the full advantage of this position appears only when we regard the possibilities of technical training in every important field of education, whether the emphasis be placed upon language, science, or economics. No student of the humanities need be a stranger to the laboratory of science, or the workroom of the fine or useful arts; no student of science need be a stranger to the humanities; no student of the arts of production and exchange need be ignorant of language or science, for there is time for the development of insight and the acquisition of efficiency in all the typical fields of knowledge.

Discussion: — Facilities, teaching force, daily program, etc., needed to realize the 'laboratory idea,' in classical, scientific, and industrial training.[1]

4. The Order in which Languages shall be taken Up. This is mostly fixed by custom in various schools and countries. Though from time to time the recommendation is made to place Greek before Latin, the consensus of opinion the world over is that Latin should come first. With

[1] See Curricula of Industrial and other High-Schools.

regard to the priority of French or German in American schools, opinions differ. Some say that since French is more nearly allied to Latin than is German, it should be the language first begun; the argument can be made that for this very reason it should not come first, or perhaps at all, since modern education may be considered to have time enough for but one language of a kind. Furthermore, since we have a large number of German-speaking people in our population, it is easier to find teachers who can speak the German almost or quite as a mother tongue than it is to find teachers of French with like ability. In most schools this question is left an open one to be decided by the qualification of teachers, the wishes of parents, students, etc.

"Whether Latin or a modern language should come first in a well-ordered course of study is a question upon which teachers differ. It is one of the questions upon which, in the existing state of psychological and pedagogical science, it is just as well not to dogmatize. It is often urged that the discipline afforded by the study of Latin makes the subsequent learning of a modern language easier. This is true, but the converse is no less true."[1] Since Latin is not usually begun in American schools until the age of fourteen or fifteen, most educational bodies interested in language study recommend the beginning of

[1] Report of the Committee on College Entrance Requirements (Committee of Twelve of the Modern Language Association), pp. 98–99.

a modern foreign language in the grades at the age of eleven or twelve. In Germany, however, this question is a more burning one, for while the gymnasiums regularly begin Latin at the age of nine or ten, the 'Reform Gymnasium' at Frankfort a. M. pursues French for three years before beginning Latin, thus limiting the study of Latin to six years, instead of nine as in the older gymnasiums. This innovation is vigorously contested on all sorts of grounds, lest it undermine in a measure the character of German classical education.[1]

The further consideration of the early introduction of modern foreign languages under American conditions may well be postponed until the proposition for a six-years' high-school course is discussed.

DISCUSSION: — 1. Herbart's reasons for recommending that Greek precede Latin.[2] 2. Advantages that are expected from studying French for three years before Latin is begun, as seen in the German Reform Schools.[3]

5. *Types of Curricula*

Owing to causes already sufficiently explained, the abundant subject-matter of secondary education falls naturally into several types of curricula, in order to meet the varied needs of a democratic society. So distinctive in character are some of these curricula that in large cities

[1] Russell, "German Higher Schools," pp. 399–405.

[2] Herbart, "Outlines of Educational Doctrine," pp. 282–284.

[3] Russell, "German Higher Schools," pp. 399–405.

they often rise to separate schools. In general, however, several types of curricula appear in the same high school under the name of courses of study. It is possible to arrange a course of study for each student; this is often done in special cases, and is even attempted for all students in some schools. Obviously, however, such a precedure involves much labor and is especially liable to error, either on the part of the teacher who prescribes, or on that of the student who chooses. Students fall naturally into classes, such as those who are fitting for college, or those who are well adapted to profit by certain types of study. On the basis of this natural division in the wishes or abilities of the students it is possible to formulate courses of study, liberal and relatively complete in character, which will answer to the several needs of the students. If further flexibility is desired, electives from among fairly equivalent studies may be offered in the later years of each course.

The construction of these courses of study is often left to custom or the individual opinion of the principal or the superintendent who formulates them. The school officer, however, who wishes to proceed with some degree of scientific accuracy, must apply the principles explained above in the present chapter to at least five important points: —

1. What studies shall be chosen for each course? On the basis of a study of educational values and equivalences, it has been recommended that each distinctive type or group of studies be represented in each high-school course,

the degree of representation being governed by the size and qualifications of the teaching corps, also by the general character of the course itself.

2. How much time shall be devoted to each study chosen; *i.e.*, for how many periods per week; for how many terms or years shall it be taught? No absolute principle can be established to govern this matter. The consensus of our best educational opinion, however, is to the effect that to get the full educational value from a subject it must be taught with considerable intensity for a considerable length of time. Some subjects like languages and mathematics must be continued for a series of years; others may be disposed of in briefer periods. The minimum for effective work in any branch is thought to be four or five periods per week for a half year.

3. What shall be the content of the subjects chosen? Here again cumulative experience is the best guide. Fortunately, we have a number of trustworthy formulations of such experience in American schools. The first in importance is the Report of the Committee of Ten of the National Educational Association,[1] with its nine sub-committees of ten each. The second is the Report of the Committee on College Entrance Requirements of the N. E. A.[2]

[1] Report of the Committee of Ten, N. E. A., published by the American Book Co., New York, Chicago, and Cincinnati.

[2] Published by the Association, Irwin Shepard, secretary, Winona, Minn.

Other important reports in this field are those issued by the college entrance examination Board of the Middle States and Maryland,[1] the New York State Academic Syllabus, renewed every five years and issued by the Education Department of the State, and the numerous reports of committees of educational associations throughout the country, to be found in the files of the *School Review*, which is published at the university of Chicago. All of these reports are national in scope, and worthy the most careful study.

Discussion: — Comparison of the various curricula given in the Appendices with respect to the points discussed above.

4. What shall be prescribed and what elective in each course? The principles that should govern here have been explained above in Section 94.

5. How many recitation periods per week shall be required of each student? The Committee of Ten suggest a uniform requirement of twenty, but they take no account of extra time needed for music, drawing, and other forms of manual work. The European systems uniformly make much larger demands. President Butler[2] would hold the student to a minimum of twenty-five full hours of educative work per week. Unless the stamina of American youth is much below that of European, this cannot be held to be an excessive re-

[1] See Annual Report in the *Educational Review.*

[2] "The Meaning of Education," p. 157.

quirement. When laboratory work is included, it is certainly not excessive.

The names in most common use for the several courses are as follows: —

(1) *Classical:* three foreign languages, one modern.

(2) *Latin-Scientific:* two foreign languages, one modern.

(3) *Modern Language:* two foreign languages, both modern.

(4) *English:* one foreign language, ancient or modern.

(5) *Manual Training:* any one or two foreign languages, usually modern.

(6) *Commercial:* usually at least two modern foreign languages.

The first four of the above courses take their names from the languages taught in them; the last two from the leading characteristics of the courses themselves.

DISCUSSION: — Consideration of the types of curricula given in the Appendices.

6. *A Six-Year High-School Course of Study*

Resolution IV of the Report of the Committee on College Entrance Requirements [1] reads as follows: *Re-*

[1] P. 30; see also Coy, "A Readjustment of the High-School Curriculum," Proceedings N. E. A., 1903, p. 177; also Hanus, "A Modern School," pp. 99–109.

solved, That we favor a unified six-year high-school course of study beginning with the seventh grade.

This implies either that the twelve years now devoted to elementary and higher education together (elementary school, 8 years; high school, 4 years) shall be so divided that secondary education shall occupy six years, and elementary education six years; or that the beginnings of some secondary school studies shall start in the last two years of the grammar school. The latter is what is recommended by the Committee, but the former has been proposed as a principle. In Europe generally the elementary are so distinct from the secondary schools that there is but little transition from one to the other, there being no common educational ladder for all classes of the population. Under these circumstances, the elementary schools begin at the age of six years and continue to that of fourteen, whereas the secondary schools begin at the age of nine or ten and close at the age of eighteen or nineteen. Much of the enviable superiority of these schools is due to the fact that real secondary studies, especially languages and mathematics, may be begun very early, and continue unbroken throughout the nine years' course. Having an educational ladder running through all our elementary and educational system, however, it is evident that we cannot copy the European plan, even were we on other grounds disposed to do so. Yet the extension downward of our secondary period, at least for important subjects demanding much

time, is highly desirable in public education. Some of the more prominent reasons for this change may be briefly mentioned: —

1. Such a plan would prevent the undue prolongation of strictly elementary methods, thus conducing to greater intellectual independence and efficiency. English boys take their plunge into Euclid's geometry at the age of eleven or twelve, some three or four years before American boys are supposed to be mature enough to make the attempt. In manners American boys are reputed to be more precocious than their English cousins; — why their prolonged infancy in intellectual capacity?

2. The proposed change in the kind of instruction in certain subjects corresponds closely to the physical and mental changes at the beginning of adolescence. In this case six years would be given to the mastery of the elementary arts, while the next six years could put the emphasis upon studies which provide at once for culture and for efficiency in life.

3. Such a plan would enable students to prepare more efficiently and with less nervous strain for more extended courses in college, professional or technical schools. Four years is too short a time for grounding the student in mathematics, languages, science, history, and the other studies demanded for entrance to higher institutions.

4. As Professor Hanus suggests, this arrangement

would make it practicable to introduce industrial training during the last two years of the grammar school for those who were not going into the high school; and to do the same on a higher plane during the last two years of the high school for those who did not propose to enter any higher institution of learning.

5. This plan harmonizes with the experience of foreign countries and the practice of our own private schools. A good private school can easily prepare a boy for college in from one to two years less than are required in a public high school, provided he begins his secondary studies by the time he is eleven or twelve years of age.

The obstacles in the way of such a movement are chiefly of two kinds, first, those of administration and equipment, and second, lack of adequately trained teachers. Neither of these is insuperable. A difficulty, though hardly an obstacle, is the need of preserving the regular four years' high-school courses for those who for one reason or another begin no secondary subjects in the grammar school. The Committee of Twelve of the American Philological Association[1] suggests that the Latin of the seventh and eighth grades be made an equivalent of the ordinary first year's work in Latin in the high school. Students who have had these two preparatory years' work would join the second Latin class in the high school and continue with them to the end of the course. A similar arrangement

[1] Report of the Committee on College Entrance Requirements, p. 72.

could be made for French and German;[1] for mathematics too, should American boys prove as capable in intellect as they are mature in feeling.

DISCUSSION: — Which shall be the ideal of the American high school: a complete general education fitting directly for all higher professional institutions, or as at present an incomplete general education, to be finished by a few years in college or university?

7. *Junior High Schools*

The problem of the six-year high school is being solved in a number of American cities by the establishment of what has become known as the Junior High School. This is notably the case in Columbus and Dayton, Ohio; Kalamazoo, Grand Rapids, and Saginaw, Michigan; Alton, Illinois; and Berkeley, California, while very many cities have adopted some plan for making high-school studies reach down into the seventh and eighth grades of the grammar school.

The Junior High Schools of Columbus, now four in number, may serve as types for this form of organization. Each Junior High School embraces the seventh, eighth, and ninth grades, or the last two grades of the grammar school, and the first grade of the regular high school. These pupils are assembled in buildings devoted

[1] See Report of Committee of Ten.

entirely to the junior work. The studies in general are taught on the departmental plan.

Fullerton,[1] reporting on the Junior High Schools of Columbus, gives the following course of study: —

SEVENTH GRADE

Reading	3 to 5 periods weekly
Classics	2 periods weekly
Spelling	3 to 5 periods weekly
Writing	2 to 5 periods weekly
Arithmetic	4 to 5 periods weekly
Grammar	4 to 5 periods weekly
Geography (incidentally in connection with History).	
History	4 to 5 periods weekly
Physical Culture	2 to 5 periods weekly
Drawing	2 periods weekly
Manual Training	2 periods weekly
Music	2 periods weekly
Physiology and Hygiene	1 period weekly
German	3 to 4 periods weekly

EIGHTH GRADE

Reading	3 to 5 periods weekly
Spelling	2 to 4 periods weekly
Writing	2 to 4 periods weekly
Mathematics	3 to 4 periods weekly
Grammar	4 to 5 periods weekly
Geography (incidentally in connection with History.)	
History, U. S.	4 periods weekly
Elementary Civics	1 period weekly
Physical Culture	2 to 4 periods weekly
Drawing	2 periods weekly

[1] Fullerton, C. H., "Columbus Junior High Schools," Report for 1912.

Manual Training	1 to 2 periods weekly
Music	2 periods weekly
Physiology and Hygiene	1 period weekly
German	3 to 5 periods weekly
Latin (may be taken by exceptionally strong pupils)	5 periods weekly

NINTH GRADE

English	5 periods weekly
Latin or German	5 periods weekly
Algebra	5 periods weekly
Elementary Science, 2 months; Physical Geography, remainder of year	5 periods weekly
Drawing	2 periods weekly

Length of periods, 40 minutes.

The following is a summary of the chief arguments cited by Fullerton in favor of the Junior High School:

1. The plan increases and equalizes the personal influence of the teachers.

2. Since small classes may be formed more readily, there is better opportunity for individual work.

3. Good order is more easily secured because of increased interest in the studies, because of greater variety and better teaching.

4. The movement of pupils from room to room is restful and adds to the variety which the adolescent craves.

5. Pupils are thrown on their own resources and become more independent, thus making the transition from elementary to secondary education natural and easy.

6. Individual development is encouraged through this independence and self-expression.

7. Instruction can be better adapted to individual needs because of the number of teachers and the introduction of new studies.

8. The teacher's work, being more concentrated, is better done.

9. Better grading is made possible, since there is no object in keeping up the size of the class.

10. Better continuity in a study is promoted by the departmental plan.

11. Promotion by subject takes the place of class promotion more easily.

12. Better teachers can be secured, since higher education may reasonably be demanded in Junior High Schools.

Objections to the Junior High School plan by a certain rather small percentage of teachers and principals who have considered it, are urged as follows: —

1. The personal influence of the teacher is lessened by being more widely distributed.

2. The child can adjust himself to one teacher easily, but is confused by trying to do so with several.

3. It is more difficult to place responsibility for poor teaching, since poor teaching in one subject tends to lower the pupil's standing in all subjects.

4. The plan increases the difficulty of securing good

order because of confusion in passing from room to room.

5. The teachers will tend to exaggerate the importance of their subjects and to make the work too difficult for pupils of that age.

6. Teachers become narrow by being confined to the teaching of one subject.

7. This plan makes the school organization more difficult.

From a given investigation in 1910, it is reported that 471 principals had tried the Junior High School plan in some form; and that 467, or 76 per cent of all reporting, favored it.

The most thorough-going advance in this field was made in New York State in 1910, when it was provided that the seventh and eighth grades should form an Intermediate School, in which high-school subjects may be introduced. This is the most important improvement in educational administration that has been made since public high schools were established, for it makes the Junior High School or some equivalent school possible, and the prediction may safely be ventured, that the New York plan will ere long be followed by a majority of the states of the American Union.

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